THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XXII. No. 546.] LONDON, AUGUST 26, 1873. [25TH YEAR.] Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

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GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
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IMPROVED DRY GAS-METERS.

These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.
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BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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AND GAS APPARATUS OF EVERY DESCRIPTION.

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By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

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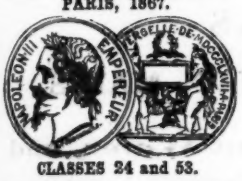
PARIS, 1867.



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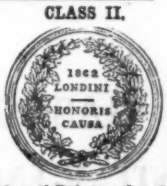

This Paint having been in general use over eleven years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

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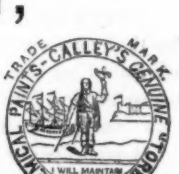

THESE PAINTS ARE SPECIALLY PREPARED, and are most valuable for protecting and arresting rust on all ironwork, AND WILL COVER TAR EFFECTUALLY; they adhere strongly, acquire great solidity, do not crack, flake off, or blister by heat, and they resist the effects of SULPHUROUS AND GASEOUS EXHALATIONS.

They are used extensively at a large number of GAS-WORKS, on Gasholders, Purifiers, and all classes of Ironwork; also by Government, Railway Companies, &c.

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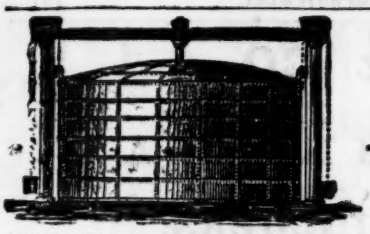

IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

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SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

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PATENTEES AND MANUFACTURERS OF THE

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Which are now so extensively used.

During the last year these Valves have been introduced into some of the large gas-works in London, where they are giving the greatest satisfaction. Favourable reports have been received from the engineers of these and of some of the most important works in the kingdom. The demand for them both for home and foreign works continues unabated.

Every Valve is made with covering bars, to protect ALL the faces. The Patentees found the necessity for this almost immediately after they commenced the manufacture of these Valves, and they have ever since adopted the practice. The large experience they have gained has also enabled them to introduce several minor improvements in the construction of their Valves. It is an advantage peculiar to these Valves that the covers can be easily raised, the faces cleaned and oiled, and kept in perfect condition. If managers of gas-works will periodically attend to this, the Valves will be as good after twenty years use as when first put in.

Messrs. COCKEY AND SONS have been very successful in the erection of many gasholders, some of very large size. They erected, in 1871, at Dublin, for the Alliance Gas Company, one of the largest in the kingdom; telescopic, 182 feet 6 inches diameter. It was referred to by the Chairman of that Company the following year, in his report to the shareholders, as having been in use, and working most effectively, since its erection, and being in the highest degree satisfactory to the Company.

Plans of gas-works are carefully prepared, and every improvement which long practical experience can give is introduced into works entrusted to the care of the Advertisers.

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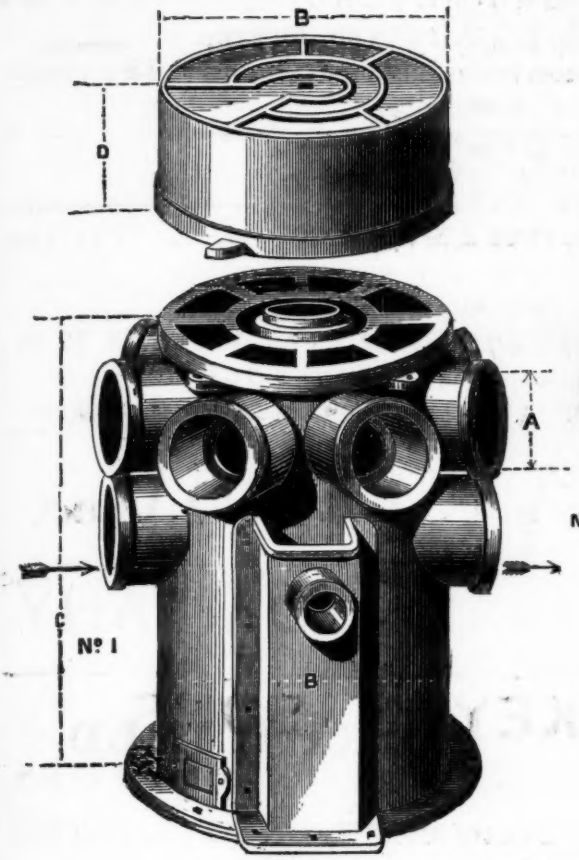
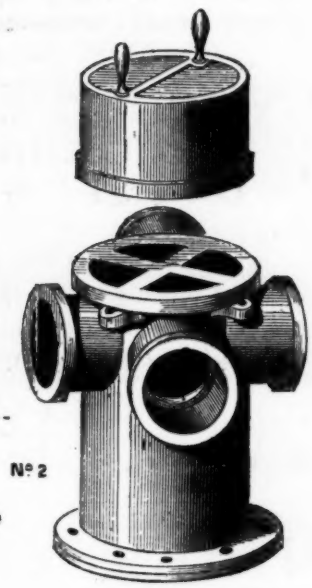
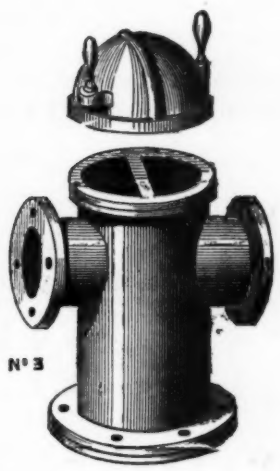
MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.







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THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body .	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

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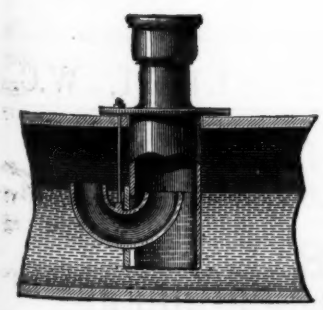
And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



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These Patent Self-Acting Dip-Pipes are rapidly coming into general use by gas companies. By their use the whole of the pressure caused by the old kind of Dip-Pipes is entirely removed, therefore the yield of gas per ton of coal is considerably increased. They also act as a perfect safeguard against the deposit of carbon (or scurf) inside the retorts.

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STATION-METERS OF ALL SIZES, with PLANED JOINTS;

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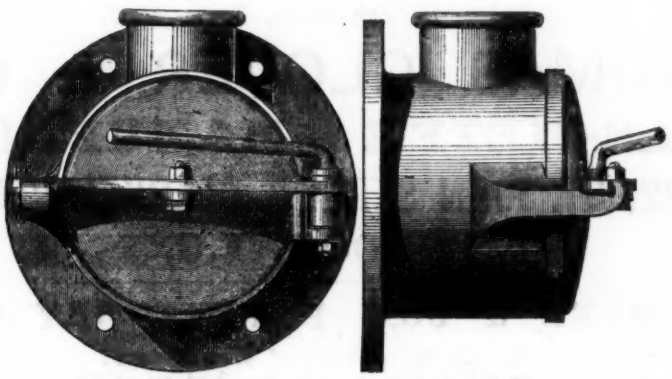
HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 7000 IN USE.

NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW. SIDE VIEW.

SIMPLE.

ECONOMICAL.

DURABLE

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

THESE LIDS ARE IN USE AT THE FOLLOWING (AMONG MANY OTHER) GAS-WORKS:—

The Gaslight Company, Beckton (where over 2000 are in use).	The Gas-Works, Royal Arsenal, Woolwich.	The Nottingham Gas-Works.
„ Gaslight Company, Bow Common.	„ Alliance and Dublin Gas-Works.	„ Newcastle-on-Tyne Gas-Works.
„ London Gaslight Company.	„ Edinburgh Gas-Works.	„ Carmarthen Gas-Works.
„ Independent Gaslight Company.	„ Manchester Corporation Gas-Works.	„ Merthyr Tydfil Gas-Works.
„ Phœnix Gaslight Company.	„ Salford Corporation Gas-Works.	„ Ystrad Gas-Works.
„ South Metropolitan Gaslight Company.	„ Rochdale Corporation Gas-Works.	„ St. Alban's Gas-Works.
„ West Ham Gas Company.	„ Liverpool United Gas-Works.	„ Over Darwen Gas-Works.
	„ Birkenhead Gas-Works.	„ Aylesbury Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial, among others, has been given:—

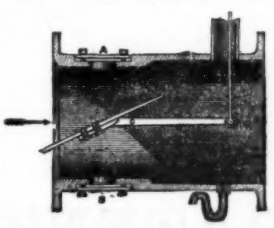
The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov. 14, 1871.

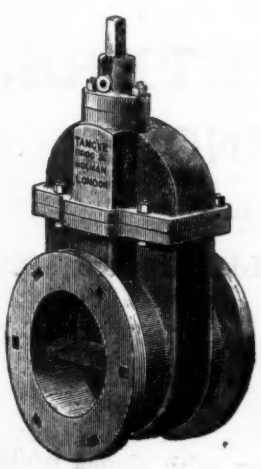
Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) F. J. Evans.

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communication being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber, upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.





London Gas-Works, Nine Elms, Dec. 25, 1871.

Gentlemen,—The 18-inch Hunt's Patent Throttle-Valve Governor supplied by you to this Company has been in use for about six months, working very satisfactorily; it obviates entirely the oscillation which sometimes occurs with the ordinary Governors, with the annoyance and danger arising therefrom. The efficiency of this Instrument, together with its compactness and lowness of price, ought to ensure its general adoption.

Messrs. Tangye Brothers and Holman. (Signed) Robert Morton, *Engineer.*

TANGYE BROTHERS AND HOLMAN

Have in Stock, and ready for immediate delivery, the following GAS-VALVES:—

20 3-inch Rack Valves.	9 6-inch Screw Valves.	13 10-inch Screw Valves.
7 4 „ Screw Valves.	14 8 „ „	12 12 „ „
10 5 „ „	10 9 „ „	14 14 „ „

CLELAND'S PATENT DIRECT STEAM-JET EXHAUSTERS.

TRAVELLERS AND HYDRAULIC LIFTS FOR PURIFIER-LIDS, &c.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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PATENT WET & DRY METERS,

STATION-METERS AND GOVERNORS,

PRESSURE REGISTERS, GAUGES,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 26, 1873.

Notes upon Passing Events.

CHANGES in the persons of the Ministers which are merely political have nothing to do with the objects of this JOURNAL; but there are several offices of the Government, the management of which materially affects the interests it is our duty to protect. The office of the Board of Works must be approached for two purposes—by those who have some interest to defend against aggression, as in the instance of the land on the Embankment, which the Government desired to appropriate, and by those who have some improvement, falling within the Office of Works, to suggest. The representatives who desire to oppose or propose will draw a deep sigh of relief on hearing that Mr. Ayrton is removed to a semi-sinecure, where his lawyer-like acuteness may exhaust itself in written opinions that will trouble no one, because written insolence which is not published is easily forgotten by every sensible man. Mr. Ayrton may now bid a long farewell to all his hopes of greatness. In his case an offensive temperament has neutralized all the benefit of his unquestioned ability, industry, and taste for work. He reminds one of the story of the wine merchant who forwarded to the late Lord Derby a sample of wine "warranted not to produce gout," of which the earl acknowledged the receipt by saying, "Sir, I have tasted your wine, and prefer the gout." The next time a Liberal Cabinet is formed, Mr. Ayrton will probably be told that his abuse is preferred to his assistance. The world outside of Scotland and the House of Commons knows nothing of Mr. Ayrton's successor, Mr. Adam, who has been Scotch whip; but a whip implies civility and tact. We shall not be surprised to see many important subjects connected with the traffic of London brought before Mr. Adam. For instance, the dangerous crowd—almost a block—at the corner of Constitution Hill, in the season, which might be so efficiently mitigated by constructing a covered way under the Green Park opposite the Hamilton Place extension of Park Lane. Again, there are the Green Park Gates on Constitution Hill, open to horsemen, but closed to all carriages except the privileged, whose names fill a very thick book. Nothing but some ancient superstition can be the cause of this exclusion, since even cabs are permitted to pass close alongside Buckingham Palace and Marlborough House on their way to and from Birdcage Walk and St. James's Street. With a new First Commissioner of Works, and a Cabinet in want of every scrap of popularity, now is the time for mooting these "Constitution" Hill questions. Then, again, there is the subject of public bathing, which lies equally between the First Commissioner and the Metropolitan Board. The Metropolitan Board could find, if it chose, sections of the canals that intersect or meet in London where, without any offence to decency, the street boys could become clean after doffing their more or less ragged garments. Something also might surely be done on the Thames, at Battersea for instance, in the way of screens for undressing, dressing, and taking the water at certain hours. The Serpentine does not afford the accommodation it ought. Why should it not be planted with such growing shrubs or annuals expressly with the view of sheltering the bathers?

No change has yet been made in the *personnel* of the Post Office, although divers recent events have shown that an efficient head is urgently required. Blunder succeeds blunder. The chiefs, not satisfied with the position of impeccability which frees them from responsibility for the dishonesty or stupidity of letter-carriers, are constantly endeavouring to lessen their work. Registered letters may be and are stolen, and no compensation is secured by the registration fee. People grumble to themselves—their complaints are so old and frequent that they cease to be amusing, and therefore newspapers decline to publish such correspondence. But there has been some pressure put on the Postmaster-General or his secretaries and the tribe of Hills—who make such mountains of objections to every improvement not originated within the sacred circle of the Post Office—by the House of Commons; hence the attempt to make the transmission of postage stamps illegal failed. The latest scandal brought to light is connected with the transmission of foreign post-office orders. The home system is bad enough. Each postmaster, when orders are issued, ought to receive an advice of those due that day. In theory he does. Each packet of letters ought to contain a letter or memorandum of each separate order. But as these are written on thin flimsy paper, and not enclosed in a coloured envelope (which would cost money), they are constantly lost. The result is that, in country places, the holders of post-office orders frequently have to make several journeys to obtain a few shillings. A correspondent of the daily papers has called attention to the much more serious mismanagement in the Foreign Post-Office Order Department. The victim sent a post-office order to his son at Rotterdam. It took nearly a week before he could get it cashed, having in that time spent the amount in hotel bills and telegrams. The following is the system:—

> The Ludgate Hill office is not permitted to give notice to the head office of foreign orders until after the close of the office, and the head office did not send instructions abroad for 24 hours after the issue of the order, thus losing one day. The chief office in Holland makes out fresh orders, transmits them to its various branches (which consumes another two or three days), and all this time the unlucky holder of the order is detained at a foreign hotel at heavy charges, and is prevented attending business of a most vital character requiring his presence in London.

This is the department which the *Spectator* calls a miracle of good management, and which Mr. Scudamore lectures on as an example of what the State could do in the management of railways. If future ministerial changes should promote Mr. Monsell from the Post Office to the governorship of some colony, where his fine presence, his agreeable manners, knowledge of official routine and parliamentary usage would find scope, and if, as has already been suggested by a leading organ, the bland yet capable Mr. Forster were promoted to the Post Office, we might expect a useful reorganization of a very muddled department. But, praised by ignorant people because, paying no damages for defaults, it makes large profits, the vital defect of the Post Office is that it is a money-making department. There is constant temptation for every official to starve the service in order to show a good balance-sheet, without that pressure of responsibility which rests on private companies, who have to pay for goods stolen, lost, or damaged, as well as pay a dividend. Practically the Post Office is removed from the pressure of public opinion except when some grave scandal affecting a whole class occurs. The rabid abuse of railway management, and the perpetual praise of Post Office management, in the *Spectator* puzzled us, until it was suggested that the writer was one of the Post-Office oligarchy. The latest sample appears last Saturday, when an old hand furiously bullyrags the railway companies because they hesitate to grant third-class return tickets. The reason of the hesitation is obvious—it would amount to a large reduction of fares—for as large a traffic would spring up in third-class return tickets as now exists in excursion tickets, and it would be daily. The *Spectator* vows what wonderful things the Government would do for railways if it had them. Take from railway companies the responsibility for goods lost, stolen, or injured, and cost, true and false, of passengers injured, and they could afford a large reduction of fares. The *Spectator's* theory is that a Government elected by a wide suffrage must transact business best for the people. Is this true in American officials? Is it Mr. Ayrton or Mr. Lowe, or the Admiralty, or the War Office, that is to find officials for managing the railways; or the Post Office, where the subordinates are in mutiny, and registration secures no indemnity from robbery? Since the above remarks were written, we learn with satisfaction that Mr. Monsell has retired from the office of Postmaster-General.

The supposed transmission of typhoid fever in the metropolis, through infected milk, and this milk supplied by a company which takes particular pains to obtain a pure article, has created no little sensation, and led to a close investigation which cannot fail to result in good. Of course a lamentable event like this could not take place without some one making a fool of himself in airing a pet theory. That ignorant people should cry out that the poisoned milk was the result of consuming sewage-grown grass was to be expected. People ignorant of chemistry are not aware that sewage properly applied passes through the earth to feed the roots of the plants, which can be no more affected by it than the turnips which have gathered their strength from a manure composed of rotten farmyard dung, assisted by superphosphate of lime and guano. All the vegetables supplied by the market gardens of London and Paris are grown from rotten manure and as much nightsoil as can be got. Round Manchester the nightsoil, mixed with ashes, is delivered to the market gardeners in a solid state. In these cases, where sewage is used, not to percolate through, but to irrigate the land—a vicious and wasteful system once practised, now generally condemned—and where the cattle are put to feed on the befouled herbage, it is within the bounds of possibility that the flesh and milk of the animals might be deteriorated. But the cardinal point of a properly arranged sewage farm is, that it is in the first instance passed through the soil, there leaving its fertilizing and offensive ingredients. Quite ignorant of this essential element of successful sewage farming, Mr. Alfred Smee, F.R.S., with that vanity which so eminently distinguishes him (Mr. Smee is always ready to lecture at any time or place, with or without notice, on the same subject—his garden and his own doings and sayings), rushes into print with a mischievous letter of assertions without a word of proof. Thickly populated England is in a condition as to sewage nuisances which can, in the majority of instances, only be relieved by a sound system of sewage farming. All the chemical devices for manufacturing solid manure at a profit, or, indeed, without loss, have failed. The demand for food requires the utilization of every ingredient of fertility. Mr. Smee began by writing that when, on two occasions, his cows were fed on sewage grass, the butter became so offensive that he could not bear it on his table. As we have already stated, the infected milk did not come from a sewage farm. We can state from ample personal experience that the milk and the butter of a properly arranged sewage farm are only remarkable for their richness and sweetness. Dr. Williams, writing from the Hayward's Heath Lunatic Asylum, in answer to Mr. Smee, says:

It does not appear that any of the persons who ate this butter were attacked with typhoid fever, or, indeed, any the worse for it; so that I scarcely see how Mr. Smee substantiates the position he has taken up. His experience is diametrically opposed to ours in the dairy attached to this asylum. We number in this establishment nearly 1000 souls, and the whole of the sewage from this population, averaging 35,000 gallons a day, is employed to irrigate about eight acres of land. This land is divided into three portions. On each portion Italian rye-grass is grown for two years, and during the third year roots. The cropping is so managed that there shall always be two portions of the land under rye-grass and the third under roots. The rye-grass grows most luxuriantly, often reaching four feet high, and is cut four or five times during the year. From the beginning of April to the end of October about 30 cows and 12 horses are fed almost entirely on it. No ill effect has ever been experienced. On the contrary, our cream is so rich and good that we are able to clot it after the manner of the Devonshire farmers, and I never knew the butter to be bad. I should add that about one ounce of commercial carbolic acid is poured down every water-closet in the asylum each morning, and that the sewage, both solids and liquids, is distributed directly on to the land, and without the intervention of any tanks. This has been going on now for at least twelve years. It would be interesting to know how the sewage used to irrigate Mr. Smee's grass is treated, as there certainly must be something peculiar about it.

Mr. Buck, the officer of health of Leicestershire, concludes a letter to the same effect by offering to send Mr. Smee some "fine vegetables "grown by sewage." Mr. Baldwin Latham, who has had experience of the Croydon Sewage Farm, which is by no means laid out on the best plan, writes:

For some years past my household have used no other milk than that supplied direct from a sewage farm, and have also used butter from the same source whenever we were fortunate enough to get it. The milk has been repeatedly kept for 24 hours before being entirely consumed, yet no member of my family has ever detected anything unpleasant in it. On this point I may refer to a paragraph in Dr. Carpenter's *Physiological and Medical Aspect of Sewage Irrigation*, page 47, in which he says, "The character of the milk and butter obtained from cattle is considered a good proof of the kind of food consumed by them." I will upon this point quote the authority of Mr. R. W. Fuller, an agriculturist and land agent of some standing in the south of London. He states (*Croydon Chronicle*, March 2, 1869):—"That if there is one thing more than another by which improper food given to cows might be detected, it was in the flavour given to butter. This was a test which never failed. Ever since Mr. Marriage had had the Beddington Farm he (Mr. Fuller) had purchased the grass grown upon those fields. His cows and horses were fed with the grass, and they were never so well or so healthy as when so fed. The milk was excellent and in superior quantity; and with regard to the butter, he could most positively assert that its taste and odour were perfect. His cows stood in their sheds with nothing to eat but the grass and a little artificial food, and no animals could look better or more healthy than they did." It should be observed that the cows of Mr. Smee were only fed with a small portion of sewage grass. In my own experience, cows which are only partially fed on the rich succulent sewage grass, will, if turned out, eat any succulent food—such, for example, as rushes, which are known to give a most disagreeable quality both to the milk and butter. They may also eat other herbs which will give a distinct character to the milk, so that the mode of feeding adopted by Mr. Smee is no criterion as to the influence of sewage produce on cows; and if Mr. Smee or any other person chooses to make any experiment the cows should be stall-fed entirely on sewage produce, and the result will show, as tested by many years experience, that both the quality of the milk and butter will surpass that produced from unirrigated lands.

Mr. William Hope, V.S., whose name is identified with the most scientific, zealous, and conscientious attempts to solve the sewage farming question, in answering Mr. Smee's "sensational statement," concluded by saying:

Mr. Smee offers to place a cow at your disposal for the purpose of experiment. I have great pleasure in offering to place at either your disposal or that of Mr. Smee my entire sewage farm at Romford, for the purpose of any and every experiment which he can possibly devise. He can taste vegetables of all kinds grown by the sewage. He can taste cheeses made with the milk, and already some months old, but not yet ripe. He may analyze the grass, examine it with a microscope, analyze and examine the milk, watch and examine all the processes going on at the farm—butter-making and cheese-making—and he may make comparative experiments to ascertain the length of time that the milk, butter, cheese, and any other produce on the farm will keep as compared with his own produce; and, finally, he may do, as Dr. S. Cobbold did, slaughter one, or, if he likes, several of the animals, and dissect them, and microscopically examine them, and analyze them, and eat them.

Dr. Rees Phillips and Mr. Thomas Hales confirm the evidence of Dr. Williams at the Devon County Asylum:

The whole of the sewage from the 800 people contained in the asylum is distributed by irrigation over some grass fields on which our cows feed. Our cows are always in excellent condition, and yield a large quantity of milk. The milk is of a very superior quality, the per centage of cream being considerably above the average. The butter is excellent, and keeps well. Undoubtedly our system of dealing with the sewage is wasteful. To make the most of the sewage, the land should be ploughed up, and arranged in proper plots for growing Italian rye-grass, &c., as at Mr. Hope's Romford farm. The cows should be stall-fed, and their food cut and carried to them. But fed as our cows are, in fields irrigated with streams of sewage, they thrive, and yield most excellent milk.

At the South Metropolitan Schools, Sutton, writes Mr. Hales,

There is a population of 1600, and a consumption of water of about 20,000 gallons daily; a large number of cows and pigs, and three horses. The whole of the sewage flows on to the land direct from the establishment with the best possible results. Some few years ago this was not the case, as the sewage was allowed to flow into cesspools, and so become deteriorated and offensive before it reached the crops. This is now altered. The solid matter is caught on a grating, cleared away every morning, and the liquid is utilized on three acres of rye-grass or root crops, as we may determine. We do not allow our cows to walk among the sewage grass, which is cut and brought to the byre to them. They eat it with much relish; and, after an experience of four years, I can assert with much confidence that no evil has arisen from the use of this grass. If the consumption of milk from cows fed on sewage grass were to produce typhoid fever, surely our children, gathered as they are from dense and badly-ventilated localities, and many of them with disease in their blood, would be the first victims, and we should not deserve the name which has been given to us, and of which we are very jealous—that of the healthiest pauper school in England.

Mr. Robert Rawlinson, C.B., who has visited more sewage farms than any engineer living, endorses these opinions. Mr. Mechi, for a wonder, is silent, but those who have visited Tiptree know that for many years his cows have been fed on grass grown under a rainfall distribution of sewage—a wasteful, vicious system, but evidently not poisonous. Mr. Smee gives no facts in further information, but writes to threaten that "information shall be "dragged out of Mr. Hope the next time he appears in the "witness-box to praise sewage farms," and that "Mr. Hope gets "more remuneration by giving evidence in favour of sewage irriga-"tion than he does for working it"—an impertinence presenting one more example of the owner of a whole conservatory of glass throwing stones. We have given an abridgment of this correspondence because it affects the most important sanitary question of the day—*i.e.*, What are we to do with our sewage, no longer permitted to poison rivers?

The report of Major Frank Bolton, published in another column, on the water supply of the metropolis, shows great preparations for that Constant Supply on which the public have set their minds, which the most eminent water engineers not connected with London companies recommend, and which it would be sheer folly to attempt to impede by colourable devices. In reference to constant supply there is one point worthy of consideration. Many of the smallest class of cottages and large houses let in lodgings are unfit to receive a constant supply, or any supply of water. There are districts where the construction of a covered conduit, with five or ten taps, under charge of a turncock for certain hours of the day, with one fountain stream constantly flowing, would be of more use than any system of supply requiring cisterns for night emergencies.

Circular to Gas Companies.

To-day we publish in our usual form an abstract of the accounts of the metropolitan gas companies for 1872. One thing with regard to it must be mentioned at the outset. The Gaslight and Coke (Chartered) Company was amalgamated with the Western Company in the second half of the year, and the accounts of the former include those of the latter for the half year ending Dec. 31. The Western Company did not publish half-yearly statements, and therefore we have been unable to show in our tables, comparing 1872 with 1871, what would have been the differences if the companies had been amalgamated for the whole year. Our readers must, therefore, note that the large increase in revenue and expenditure shown in the Chartered Company's accounts is owing to the addition of the revenue and expenditure of the formerly Western Company for the half year. In like manner, we must explain that the apparently low rate of profit on capital and borrowed moneys, in the case of the Chartered Company, is due to the fact that it has been calculated on the united capitals of the two companies, while only half a year's profit of the Western is taken into account. We have to admit, then, that for purposes of comparison the Chartered Company's accounts are for this year useless.

Turning to more general matters, we find from an examination of the returns that the gas industry made but little progress in the metropolis in 1872. In the previous year the quantity of coal carbonized amounted to 1,343,303 tons. The quantity shown in these accounts to have been carbonized in 1872 amounts to 1,352,653 tons;

and if we add to this half the quantity carbonized by the Western Company in 1871, we have 1,486,093 tons, which will about represent the consumption of coal by the metropolitan companies in 1872. The increase on the consumption of the previous year is therefore only 142,790 tons.

As regards the quantity of gas sold (we refer exclusively to that sold by meter), the accounts do not look so satisfactory. In 1871 the quantity sold was 10,336,573,450 cubic feet. The amount shown in these accounts to have been sold by meter in 1872 is only 10,151,430,228 cubic feet; and if we add half the sale of the Western in 1871, with a reasonable addition for increase, it only brings the total to just about the figures of the previous year. If we look for an explanation of this unexpected circumstance, we fear it is to be found in the returns of the Chartered Company. The gas sold by this company in 1872, and returned in these accounts, is 3,226,049,000 feet, but this includes only half a year's working of the Western. The combined sales of the Chartered and Western in 1871 amounted to 3,519,615,000 feet. If, in this case also, we add to the former figures half the sales of the Western in 1871, with a reasonable allowance for increase, we cannot avoid the conclusion that the sale of gas in the case of the Chartered Company has diminished, or, at all events, has not increased. The revenue accounts lend support to this belief, for the increase in the total gas-rental is less than half the rental of the Western for 1871. In all other cases a considerable advance has been made. We must again remark that we here refer only to the sales by meter.

The rise in the price of coal is clearly seen in these returns, for the increase in cost is out of proportion to the increase in the amount carbonized. Next year's returns will certainly exhibit a much greater disproportion.

As regards the highest profit on gas-rental, the Ratcliff now takes the place occupied by the Phœnix for so many years, the order in which the companies stand for last year being as under:—

Ratcliff	42·24	per cent., price	3s. 9d.
Phœnix	39·02	„ „	3s. 9d. and 4s.
Imperial	34·99	„ „	3s. 9d.
London	35·51	„ „	3s. 9d.
South Metropolitan	32·08	„ „	3s. 0d.
Chartered	29·47	„ „	3s. 9d., 5s., and 5s. 5d.
Commercial	29·16	„ „	3s. 9d. and 4s.
Surrey Consumers	28·39	„ „	3s. 9d. and 4s.
Independent	21·72	„ „	3s. 2d.

Of course, it would be easy, if the price of gas were taken into consideration, to show that the top place in the above table should be occupied by the South Metropolitan Company. The position of the Ratcliff is explained by a diminution in almost every item of expenditure, and the exceptionally high profit per ton of coal realized.

The table showing the income and expenditure per ton of coal carbonized we regard as of the greatest interest. Except in the case of the Independent, the rental per ton of coal remains much the same as in the previous year, but it will be seen that in every instance a considerable advance has been made in the sum realized for products, and that, with the exception just mentioned, there has been an increase in the total income per ton of coal. In the items of expenditure a general advance in the cost of coal will be remarked, and, with one exception, an increase in the cost of labour. The gross profit realized per ton of coal is necessarily in most cases lower than in the previous year, and the only companies who can be congratulated on their results in this particular are the Imperial and, most notably, the Ratcliff. The Board of Trade expenses, which include the salaries of the referees, chief examiner, and auditor, and the cost of the testing-places, figure in these accounts for only £3747. The next we expect will exhibit a further reduction.

Subjoined is a table, similar to that we have given for the last two years, showing the quantity of residuals produced per ton of coals carbonized. As last year, the Ratcliff Company stand the highest in the produce of ammoniacal liquor, and also, we may add, in the money realized for it per ton of coal, the sum received being in fact 23·2d. per ton of coal. The Chartered Company stand next; they made 17·52d. for liquor per ton of coal.

Table of the Residuals per Ton of Coals Carbonized and Used, produced by the Metropolitan Gas Companies in the Year 1872.

Name of Company.	Coke per Ton of Coals, in Bushels.	Breeze per Ton of Coals, in Bushels.	Tar per Ton of Coals, in Gallons.	Ammoniacal Liquor per Ton of Coals, in Gallons.
Chartered	32·86	2·83	9·59	25·11
Commercial	28·17	3·35	10·27	13·53
Imperial	36·00	4·50	9·21	16·34
Independent	35·49	1·65	9·99	13·54
London	32·50	4·25	9·65	16·79
Phœnix	36·00	2·43	9·06	16·77
Ratcliff	35·30	3·24	7·83	29·84
South Metropolitan	34·95	2·62	9·51	19·62
Surrey Consumers	33·82	1·97	8·30	10·31
Average	35·01	2·75	9·27	16·87

Before quitting the subject of these accounts, we must notice the very able compilation published by Mr. Field,* the experienced accountant to the Imperial Company. Mr. Field's analysis is naturally fuller and more complete than that we offer to our readers. On looking through it we see that it differs from our own—so far as the two analyses are susceptible of comparison—in very few particulars, and in only one which calls for remark. In estimating the gross profit of the Chartered Company, Mr. Field deducts the £5000 paid to the defalcation account. Now this sum is really profit—not divisible profit, it is true, but still money made in the working; and in calculating the profit per ton of coal it ought most certainly to be taken into the account. In arranging his pages Mr. Field has left two or three lines at the bottom of each, so that any company may fill in the calculations, and so obtain a bird's-eye view of their own affairs in comparison with those of the metropolitan companies. Nothing can be clearer or fuller than the statement Mr. Field's method produces, and we strongly recommend provincial companies to obtain the book and fill in the details in the way pointed out.

* "An Analysis of the Metropolitan Gas Companies Accounts for the Year 1872." Compiled and arranged by John Field, Accountant to the Imperial Gas Company.

The accounts of the Imperial Company for the first half of this year give us a foretaste of the revelations which may be expected from the balance-sheets of all the metropolitan companies as they are issued. An addition of £100,000 to the cost of coal for an increased sale of 44½ millions of feet of gas, as compared with the corresponding half of 1872, is sufficiently alarming, notwithstanding the advanced value of coke and other residuals. There is also an increase of £6000 in wages. The gross profit of the half year is £10,000 less than in the first half of 1872, and the directors have to take £7829 from the reserved fund to make up the maximum dividend. Under these circumstances it is no wonder that the governor should make reference to the possibility of an application to the Board of Trade for power to raise the price of gas. We fear, however, that until the reserve is completely exhausted the Board would be obdurate. The sulphur question weighs heavily on the governor's mind; and seeing the difficulty, if not impossibility, of adapting two of the stations to fulfil the requirements of the referees, his uneasiness seems to be justified. On one point we hope he will be agreeably disappointed. The cost of the purification required is not likely, we think, to rise to 10d. per 1000 feet.

It is curious to see that the first notice we have of an intended application to the Board of Trade, under the Gas and Water Works Facilities Act Amendment Act, comes from a local authority—the Paisley Commissioners—who are about to seek for power to raise their price for gas from 4s. 2d. to 6s. At the latter price the commissioners estimate that the gas will just about pay the expenses. It is, of course, cannel gas.

There is a good deal of agitation on gas matters in Swansea just now, accompanied by the usual bluster in the Town Council, and a great deal of ink-shedding in the way of correspondence with local papers. On all sides the Town Council are urged to set up works to compete with the company. This they can undoubtedly do if they can raise money for the purpose, but we imagine they will think twice before they engage in a contest in which they can only be worsted. The immediate cause of the present outbreak of wrath seems to be the imposition of a considerably increased charge for lighting, cleansing and repairing the public lamps, the policy of making which is certainly questionable. But the good people of Swansea are in a very unreasonable frame of mind, and request the Town Council to supply them with gas at cost price, promising themselves at the same time a large surplus to go into the public exchequer in aid of rates. As we have said, the Town Council will think twice before they embark in a competing undertaking; but a conciliatory policy on the part of the company would probably allay much of the present discontent.

The Corporation of Leeds have given notice of their intention to raise the price of gas threepence per 1000, and here, there being no company to abuse, the people fall foul of coal gas itself, and demand to know why they cannot have a cheaper source of artificial light. We are sorry we cannot help them in the matter, but a host of schemes are offered to their notice, any one of which it is open to the corporation to try, in the hope of superseding, more or less completely, the expensive abomination—coal gas. We cannot promise them any success, but by all means let them try.

The extraordinary meeting of the shareholders of the Alliance and Dublin Gas Company, we are happy to see, was conducted in a most amicable spirit, and it is gratifying to learn from Mr. Drimmie that the directors and the committee of shareholders are working together in a most friendly way. They have a common object in view; the directors are largely interested in the prosperity of the company, and it could only be expected that, in the absence of a directly hostile spirit on one side, the two bodies would work in harmony to attain the desired end, which is to place the company in the position it ought to occupy as one of the most prosperous undertakings in the kingdom. The meeting is adjourned to the 30th of September, when the whole of the directors will resign and offer themselves for re-election; and we shall be much astonished to see any considerable alteration in the constitution of the board. We have only to add, that the last circular sent by the directors to the shareholders fairly sets forth the difficulties they have had to contend with since July, 1871. The report of the engineers consulted has been referred back for estimates of the expense of certain alterations suggested. As regards the retort-settings, &c., we may presume that the engineers and directors will have satisfied themselves that, as they stand, these works are incapable of producing a proper yield of gas before they incur expense in alterations.

The metropolitan gas referees have been called upon by the Paddington Vestry to exercise for the first time one of the duties imposed on them by the Acts under which they are appointed. They had to prescribe the mode by which the public lamps are to be supplied in that parish, and they have very sensibly decided upon the average meter indication system—one meter to every twelve lamps. They have further adopted the plan in use in Nottingham, which we regard as much superior to the system agreed upon for the neighbouring parish of St. Pancras.

METROPOLIS GAS COMPANIES, 1872.

REVENUE ACCOUNT, *compared with that of* 1871, *showing the Increase or Decrease in each Item.*

	Chartered.*		Commercial.		Imperial.		Independent.		London.		Phœnix.		Ratcliff.		South Metropolitan.		Surrey Consumers.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Total gas-rental	68243	..	7425	..	8647	..	..	5919	5678	..	5143	..	..	302	..	1462	856	..
Common gas	..	3913	7232	..	8172	..	..	6510	5130	..	..	1813	..	182	..	1124	962	..
Cannel ditto	68774	..	..	..	..	..	..	..	40	..	..	..	..	..	..	..	..	..
Public lights, including lighting and contracts	3382	..	193	..	474	..	591	..	508	..	6956	..	..	120	..	338	..	106
Meter-rents	2037	..	..	..	908	..	67	..	46	..	126	..	37	..	..	..	1526	..
Old materials	2243	..	175	..	..	675	453	..	..	585	481	..	..	112	501	..	94	..
Products	53642	..	11161	..	41901	..	6260	..	12613	..	15003	..	2479	..	10025	..	5535	..
Miscellaneous	724	..	6	..	94	..	..	7	..	140	86	..	166	..	..	403	11	..
Total income from all sources	126889	..	18767	..	50874	..	854	..	17612	..	20839	..	2297	..	9075	..	8022	..
Ditto expenditure on revenue account	132898	..	25923	..	28885	..	9445	..	22666	..	26957	..	..	559	13902	..	17673	..
Gross profit	..	6010	..	7156	21989	..	..	8590	..	5054	..	6118	2857	..	..	4827	..	9651
Capital and borrowed moneys	621863	..	..	..	339140	..	4500	..	19561	..	10612	..	..	..	20000	..	10942	..
Gross profit per cent. on capital, &c.	..	1·47	..	1·64	..	0·33	..	3·94	..	0·80	..	0·73	2·47	..	..	2·26	..	3·95
Ditto ditto on the gas-rental	..	4·13	..	6·59	3·10	..	..	9·15	..	3·94	..	3·90	8·72	..	..	4·42	..	13·89

* Amalgamated with Western in the second half of the year.

METROPOLIS GAS COMPANIES, 1872.

EXPENDITURE, *compared with that of* 1871, *showing the Increase or Decrease in each Item.*

	Chartered.		Commercial.		Imperial.		Independent.		London.		Phœnix.		Ratcliff.		South Metropolitan.		Surrey Consumers.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Coals, including carriage and dues	85011	..	17158	..	36398	..	7103	..	3686	..	19746	..	2991	..	10271	..	4864	..
Purifying materials	2602	..	..	60	..	353	..	55	..	39	1209	..	..	208	..	452	..	39
Supervision, labour, &c.	12760	..	1248	..	4041	..	2614	..	1915	..	1211	..	..	305	824	..	2429	..
Repair and maintenance of premises, tools, &c.	13832	..	..	4667	28346	..	413	..	5310	..	1088	..	..	1380	..	42	3696	..
Rents, rates, and taxes	3200	..	109	..	..	3558	..	421	1678	..	..	203	40	..	677	..	278	..
Salaries	1175	..	105	..	1017	..	131	..	17	..	242	..	12	..	144	..	..	1
Collectors commission	1216	..	38	..	983	..	..	17	..	98	295	..	..	9	75	..	45	..
Stationery, printing, and general charges	..	49	76	..	..	695	..	76	71	..	1457	..	64	..	136	..	78	..
Directors	..	62	..	..	..	..	..	..	..	..	..	..	..	..	..	..	75	..
Auditors	..	71	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Distribution and repairs of mains and services	3583	..	10661	..	85	..	..	93	..	289	1002	..	..	976	1104	..	3581	..
Restoring and replacing meters	633	..	73	..	986	..	39	..	..	15	72	..	..	134	223	..	139	..
Law and parliamentary charges	2863	..	69	..	..	106	88	..	185	..	1494	..	14	..	1011	..	..	21
Bad debts and extraordinary expenses	6205	..	1112	..	..	1676	..	280	10215	..	..	655	..	658	..	70	2699	..

DETAILS OF INCOME, FOR THE YEAR 1872.

Name of Company.	Total Gas-Rental.	Common Gas.	Price per 1000 Cubic Feet.	Cannel Gas, at 5s. per 1000 Cubic Feet.	Public Lights, including Lighting and Contracts.	Meter-Rents.	Old Materials.	Products.	Miscellaneous.
	£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chartered	700,599 12 4	496,620 7 10	3 9	152,504 2 11	51,475 1 7	7,810 10 4	4714 17 1	169,335 2 8	3,701 18 3
Commercial	150,393 11 10	134,729 5 11	3/9 & 4/0	..	15,664 5 11	None chgd.	747 14 6	38,492 6 5	280 2 6
Imperial	619,455 7 5	548,790 5 2	3 9	..	70,665 2 3	14,887 17 11	1409 14 2	158,037 17 5	1,560 18 7
Independent	73,956 11 0	67,583 2 6	3 2	..	6,373 8 6	2,555 6 11	881 18 6	28,827 4 7	1,071 3 5
London	182,119 6 9	151,380 16 0	3 9	10,533 6 3	20,205 4 6	3,698 17 6	263 14 5	51,422 8 10	2,933 18 0
Phœnix	213,194 10 0	180,008 2 2	3/9 & 4/0	..	33,186 7 10	4,884 15 0	709 7 5	58,784 9 5	3,293 11 3
Ratcliff	33,982 15 8	30,156 17 10	3 9	..	3,825 17 10	180 14 0	78 4 5	9,788 16 11	309 18 0
South Metropolitan	97,201 8 1	84,379 2 0	3 0	..	12,822 6 1	None chgd.	676 4 9	37,520 18 6	1,408 12 1
Surrey Consumers	72,048 12 1	59,354 4 11	3/9 & 4/0	..	12,694 7 2	1,543 0 9	158 16 0	20,802 0 7	217 18 2
Total	2,142,951 15 2	1,753,002 4 4	..	163,037 9 2	226,912 1 8	35,561 2 5	9640 11 3	573,011 5 4	14,698 0 3

ABSTRACT OF DETAILS OF INCOME AND EXPENDITURE, SHOWING THE PROFIT REALIZED.

Total Income from all Sources.	Total Expenditure on Revenue Account.	Gross Profit.	Capital and Borrowed Moneys.	Gross Profit per Cent. on the Capital and Borrowed Moneys.	Gross Profit per Cent. on the Gas-Rental.
£ s. d.	£ s. d.	£ s. d.	£ s. d.		
886,162 0 8	679,655 0 4	206,507 0 4	3,514,271 0 0	5·87	29·47
189,833 15 3	145,877 6 0	43,956 9 3	437,247 15 0	10·05	29·16
795 351 15 6	578,567 4 8	216,784 10 10	2,673,425 0 0	8·1	34·99
107,292 4 5	91,222 15 0	16,069 9 5	248,500 0 0	6·46	21·72
240,438 5 6	179,406 8 11	61,031 16 7	829,863 0 0	7·35	33·51
280,866 13 1	197,663 16 0	83,202 17 1	971,000 0 0	8·56	39·02
44,340 9 0	29,992 5 4	14,348 3 8	115,670 0 0	12·40	42·24
137,219 9 3	106,029 3 9	30,122 5 3	320,000 0 0	9·74	32·08
94,770 7 7	74,314 16 9	20,455 10 10	275,649 0 0	7·42	28·39
2,776,275 0 3	2,082,728 16 9	693,546 3 6	9,385,625 15 0	8·43 Average.	32·28

DETAILS OF EXPENDITURE ON REVENUE ACCOUNT, FOR THE YEAR 1872.

Name of Company.	Coals, including Carriage and Dues.	Purifying Materials.	Supervision and Labour in Manufacture of Gas.	Ordinary Repair and Maintenance of Premises, Tools, and other Implements. Lighting and Repairing Lamps.	Rents, Rates, and Taxes.	Salaries, Management.	Collectors Commission.	Stationery, Printing, and General Charges.	Directors.	Auditors.	Expense of Distribution and Ordinary Repairs of Mains and Services.	Restoring and Replacing Meters.	Law and Parliamentary Charges.	Bad Debts and Extraordinary Expenses.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Chartered	405,682 9 3	9,277 9 7	88,347 2 10	53,054 12 1	23,421 13 1	5,427 9 5	8,575 8 8	3,736 15 2	5,709 11 7	210 0 0	40,794 11 6	12,478 7 3	4,019 2 7	18,920 7 4
Commercial	84,290 4 7	1,862 8 9	16,606 4 11	6,566 9 10	4,274 19 10	1,628 0 0	1,448 16 9	1,487 0 8	1,500 0 0	150 0 0	22,156 5 3	1,209 11 5	69 7 4	2,627 16 8
Imperial	331,816 18 1	6,452 13 8	79,628 15 8	67,569 11 8	15,632 6 10	9,906 16 2	9,801 5 11	5,141 8 4	4,000 0 0	157 10 0	30,971 0 3	10,505 5 10	247 10 11	6,736 1 4
Independent	52,722 1 11	561 10 3	14,249 3 6	8,445 12 0	2,710 0 6	1,323 16 0	1,448 19 3	810 17 8	1,700 0 0	100 0 0	5,079 17 4	1,377 14 3	88 7 2	604 15 2
London	90,548 7 2	1,187 19 0	23,138 15 8	20,873 15 0	9,399 17 10	1,496 0 10	2,601 13 7	1,286 0 11	1,800 0 0	100 0 0	11,704 13 4	3,268 18 7	491 18 10	11,508 8 2
Phœnix	107,827 11 8	2,722 6 8	21,422 13 1	22,268 15 9	8,486 18 1	2,165 0 0	3,495 7 9	2,784 18 3	2,000 0 0	100 0 0	17,102 19 9	4,065 11 10	1,494 4 5	1,727 8 9
Ratcliff	16,696 2 10	92 9 8	4,436 11 7	2,199 6 2	1,315 13 10	672 17 6	337 2 0	333 8 2	800 0 0	31 10 0	2,088 10 10	533 5 10	14 8 4	440 19 7
South Metropolitan	58,909 4 1	906 12 7	15,516 13 6	5,302 17 9	4,501 4 1	1,615 6 8	1,455 0 8	1,317 0 10	1,200 0 0	100 0 0	10,255 15 10	2,289 9 7	1,085 5 8	1,574 12 6
Surrey Consumers	37,930 13 11	662 18 3	9,595 5 6	7,410 17 9	3,397 3 6	994 18 0	679 5 3	736 5 5	1,425 0 0	84 0 0	7,228 14 11	757 7 7	64 10 6	3,347 16 2
Total	1,186,423 13 6	23,726 8 5	272,941 6 3	193,691 17 0	73,139 17 7	25,230 4 7	29,842 19 10	17,633 15 5	20,134 11 7	1,033 0 0	147,382 9 0	36,485 12 2	7,574 15 9	47,488 5 8

TABLE *showing the Income, Expenditure, Profit, and Capitals of the Metropolitan Gas Companies per Ton of Coal carbonized in the Year* 1872.

Name of Company.	INCOME PER TON OF COAL CARBONIZED. Total Gas-Rental.	Meter-Rents.	Old Materials.	Products.	Miscellaneous	Total Income from all Sources.	EXPENDITURE PER TON OF COAL CARBONIZED. Coals, including Carriage and Dues.	Purifying Materials.	Supervision and Labour in the Manufacture of Gas.	Ord. Repair & maintenance of Premises, Tools, & other Implements. Lighting & Repairing Lamps.	Rents, Rates, and Taxes.	Salaries, Management.	Collectors Commission.	Stationery, Printing, and General Charges.	Directors.	Auditors.	Expense of Distribution and Ordinary Repairs of Mains and Services.	Restoring and Replacing Meters.	Law and Parliamentary Charges.	Bad Debts, and Extraordinary Expenses.	Total Expenditure on Revenue Account.	PROFIT. Gross Profit per Ton of Coal carbonized.	Capital and Borrowed Moneys per Ton of Coal carbonized.
	£ s. d.	d.	d.	s. d.	d.	£ s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	d.	d.	d.	d.	d.	s. d.	d.	d.	s. d.	£ s. d.	s. d.	£ s. d.
Chartered	1 11 5·42	4·20	2·53	7 7·22	1·99	1 19 9·36	18 2·54	0 4·99	3 11·59	2 4·58	1 0·61	2·92	4·61	2·01	3·07	0·11	1 9·97	6·72	2·16	0 10·19	1 10 6·07	9 3·24	7 17 9·18
Commercial	1 14 1·65	..	2·03	8 8·84	0·54	2 3 1·06	19 1·59	0 5·07	3 9·23	1 5·88	0 11·64	4·43	3·94	4·05	4·08	0·40	5 0·35	3·29	0·18	0 7·15	1 13 1·28	9 11·73	4 19 3·00
Imperial	1 12 1·25	9·26	0·87	8 2·35	0·97	2 1 2·70	17 2·50	0 4·01	4 1·55	3 6·05	0 9·72	6·16	6·09	3·19	2·48	0·09	1 7·27	6·53	0·15	0 4·19	1 9 11·98	11 2·91	6 18 7·79
Independent	1 5 7·71	10·63	3·66	9 11·94	4·45	1 17 2·39	18 3·86	0 2·38	4 11·28	2 11·13	0 11·27	5·50	6·02	3·37	7·07	0·41	1 9·11	5·73	0·36	0 2·51	1 11 7·45	5 6·86	4 6 1·94
London	1 13 11·07	8·26	0·58	9 6·94	6·55	2 4 9·40	16 10·39	0 2·65	4 5·72	3 10·65	1 9·01	3·84	5·81	2·87	4·02	0·22	2 2·16	7·30	1·09	2 1·72	1 13 4·95	11 4·41	7 14 6·92
Phœnix	1 12 3·31	8·87	1·28	8 10·79	5·98	2 2 6·23	16 3·89	0 4·94	3 2·91	3 4·45	1 3·41	3·93	6·35	5·05	3·63	0·18	2 7·07	7·38	2·71	0 3·13	1 9 11·03	12 7·15	7 7 0·05
Ratcliff	1 15 8·44	2·27	0·98	10 3·41	3·90	2 6 7·00	17 6·49	0 1·16	4 7·93	2 3·72	1 4·58	8·48	4·25	4·20	10·08	0·39	2 2·33	6·72	0·18	0 5·55	1 11 6·06	15 6·89	6 1 6·33
Sth. Metropolitan	1 7 4·50	..	2·28	10 6·80	4·76	1 18 7·73	16 7·09	0 3·06	4 4·44	1 5·92	1 3·21	5·45	4·91	4·45	4·05	0·33	2 10·66	7·73	3·66	0 5·32	1 9 10·28	8 5·8	4 10 1·49
Surrey Consumers	1 11 2·35	8·01	0·82	9 0·08	1·13	2 1 0·39	16 5·08	0 3·44	4 1·85	3 2·50	1 5·65	5·16	3·52	3·82	7·40	0·43	3 1·55	3·93	0·33	1 5·39	1 12 2·05	8 10·28	5 19 4·22
Average	1 11 6·41	7·35	1·67	9 2·48	3·36	2 1 7·80	17 4·77	0 3·51	4 2·05	2 8·76	1 2·56	5·04	5·05	3·66	5·09	0·28	2 6·94	6·14	1·20	0 9·01	1 11 4·12	10 3·65	6 3 9·88

Correspondence.

GAS COMPANIES ACCOUNTS.

SIR,—In continuation of my letter of the 25th of July, The books required to be kept in the manufacturing department of a gas company are the coal store book, the carbonizing book, and the tests book, the purposes of each of them being sufficiently indicated by its title.

The principal financial books necessary to be kept are the sub-ledger, the consumers accounts book, cash book, and ledger.

The sub-ledger is designed to contain all the personal accounts of the company, except for gas-rentals.

Subsidiary to the sub-ledger are the invoice book, to retain all invoices received; the weigh-bridge book, from which are posted the particulars of all residual products sold, and the fitters returns, from which are posted the particulars of materials and labour supplied, where the company are gas-fitters as well as gas-makers.

The consumers accounts book should contain at the appointed time a statement of the amount, but not the particulars, except in the case of gas-rents, of every account then due to the company, the entries being classified to correspond with the statements of particulars shown in the abstracts of the accounts submitted to the shareholders.

Subsidiary to the consumers accounts book is the meters inspections book, from which is transferred the present and previous dates on which the meters were seen, and the present and previous state of the indices, the difference showing the quantity of gas consumed, from which the amount due is deduced and charged.

At the time appointed for making out the gas accounts, the sub-ledger becomes subsidiary to the consumers accounts book, all accounts to be received for revenue contained in the sub-ledger being balanced by the transfer to the consumers accounts books of the gross sums due, each under its proper heading.

The correctness of the postings is proved by making a summary of the accounts debtor to the gross sum of the charges to be posted, and creditor by the amount of each separate posting, entering the reference number of each entry from the actual posting in the consumers accounts book. If correctly posted, the two sides of the summary will be equal in amount.

I have found it most convenient to keep the consumers accounts book by entering the names of the consumers in succession on the debtor side of each folio; the order of entry corresponding with that in the meters inspections book, except that when a consumer is supplied through several meters, they are entered in immediate succession to each other, though they may be in different parts of the district supplied by the company.

The accounts due from consumers must each be balanced by cash, plus discount, plus allowances, plus balance unpaid, the total corresponding with the amount charged.

One column is sufficient for dates, and one column for cash, each month's receipts being distinguished by the use of a separate colour of ink. The total sum of all the charges against consumers being balanced by the gross sum of the receipts, deductions, and arrears.

The consumers accounts being thus closed, the unpaid balances should then be transferred to a new statement of accounts, each term of arrears stated separately.

I prefer that the cash book should show at sight, on the debtor side of the account, the amounts received for petty cash, the amounts received for sundries, and of cash passed into the hands of the company's bankers; on the creditor side, the corresponding payments.

The principles adopted in this mode of keeping the accounts, are—That all the receipts of the company, whatever may be their source or amount, are to be paid to the company's banker, without deduction for any purpose whatever; and that all payments are made by cheque, drawn against the funds in banker's hands.

The books subsidiary to the cash book, kept as shown below, would be the office receipts book, into which must be entered every sum of money received on account of the company. This book must be ruled so as to classify the receipts to correspond with the accounts opened in the ledger; and be balanced at intervals corresponding with the balancings of the cash book, herein shown as on every seventh day, and at the end of the month.

The receipted payments book, showing the date of each payment, to whom paid, for what, distinguishing the amounts charged to the several accounts in the ledger; the total cash payment, the deductions for discount or allowances, the amount of the account settled, the date to which the payment made discharges the account due against the company, and the number of the folio in the cash book on which the net payment is posted.

The wages book, the use of which is indicated by its title. I have been accustomed to require every workman to attach his initials to the entry of each payment, as an acknowledgment of the receipt of the amount stated.

CASH.

Dr.

Aug., 1873.	ITEM.	Rept. Book.	Petty Cash. £	s.	d.	Cash. £	s.	d.	Bank. £	s.	d.	Folios in Sub-Ldgr.	Folios in Ldgr.
3	Deposited by William Dorè	Page 24				40	0	0	35	0	0	2	120
,,	Received from Jno. Smith. Call, 20 shares . . .								40	0	0		120
4	Deposited by Jno. Smith								25	0	0		120
5	Deposited by William Dorè								45	0	0		120
6	Ditto ditto								65	0	0		120
7	Ditto ditto												120
	Received for public gas-rentals . . .	28				110	7	6					61
	Ditto private rentals	28				84	13	9					62
	Ditto meter-rentals	28				2	7	10					68
	Ditto coke	28				12	4	6					70
	Ditto tar	28				4	1	8					74
	Ditto fittings work	28				7	4	6					80
	Deposited by William Dorè								50	19	9		120
9	Deposited by William Dorè					260	19	9	260	19	9		
11	Ditto ditto								50	0	0		120
14	Ditto ditto								30	0	0		120
	Received for private gas-rentals . . .	34				74	8	4					62
	Ditto coke	34				14	6	6					70
	Ditto tar	34				23	10	0					74
	Ditto meter-rents	34				1	7	9					68
	Deposited by William Dorè								38	12	7		120
18	Deposited by William Dorè					379	12	4	379	12	4		120
20	Ditto ditto								25	0	0		120
21	Ditto ditto					50	5	4	35	0	0		62
	Received for private gas-rentals . . .	38				1	3	2					68
	Ditto meter-rents	38				14	7	9					70
	Ditto coke	38				20	0	0				3	
	Ditto Richard Harvey. Call, 10 shares .	38					1	8				3	
	Ditto ditto Interest on call overdue .	38				0			25	17	11		90
	Deposited by William Dorè												120
24	Deposited by William Dorè					465	10	3	465	10	3		120
28	Received for private rentals	40				27	10	6	20	0	0		62
	Deposited by William Dorè								7	10	6		120
	Received for petty cash, per contra . . .	Cr.	2	10	3								
			2	10	3	493	0	9	493	0	9		
	Brought down from July 31								738	17	6		
									£1231	18	3		

CASH.

Cr.

Aug., 1873.	Rept. No.	Paid to	For what paid, and to what Account charged.	Amount. £	s.	d.	Petty Cash. £	s.	d.	Cash. £	s.	d.	Bank. £	s.	d.	Posted Folios. Sub-Ldgr.	Posted Folios. Ldgr.
1	317	Harris and Pearson .	Fire-clay goods . . .	28	17	6							28	17	6	38	27
3	318	John Owen	Retort repairs . . .	11	15	6							11	15	6	40	38
5	319	Gas-Meter Company .	Chief rent	35	0	0											12
6	320	John Hall	New meters—capital	7	10	0							42	10	0	45	32
7			New meters—renewal														
			Lime														
	320		Purifying mats, & stores	7	4	0							7	4	0	43	320
	321	John Edwards . . .	Bricksetter, labour and materials. Repairs to buildings	3	18	6							3	18	6	54	27
	,,	Banker.	As per contra. . . .							260	19	9					120
				94	5	6				260	19	9	94	5	6	4	16
12	322	Edwin Barry . . .	Coal.	127	10	0							127	10	0		
14		Wages	Manufacture	18	7	5							18	7	5		
		Ditto	Repairing retorts . .		2	3								2	3		
		Ditto	New service-pipes .		1	0								1	0		
		Ditto	Repairing hired meters.		14	5								14	5		
		Ditto	Lamplighting . . .		6	0								6	0		
		Ditto	Distribution & coals .		3	4								3	4		
		Ditto	Consumers fitting work.		1	0								1	0		
		Ditto	Clerk		2	4								2	4		
		Paid by cheque in favour	of William Dorè . . .		3	0								3	0		
		Banker.	As per contra. . . .							118	12	7					120
				160	9	1				379	12	4	234	14	7		
	323	Pyle Water Company	Water. Stores . . .	3	4	6							3	4	6	41	20
	324	Henry Nelson. . . .	Iron tubing and fittings.														
			Service-pipes . . .	10	8	9							10	8	9	46	8
		Banker.	As per contra. . . .							85	17	11					120
				13	13	3				465	10	3	268	7	10		
	325	William Dorè. . . .	Petty cash.	225	0	0	1	7	6				2	10	3	Dr. 4	116
		Spencer Coal Company .	Coal.					5	5				225	0	0		44
		Petty cash.	Stationery & advertising					7	3								50
		Ditto	Carriages					10	1								20
		Ditto	Stores	2	10	3											90
		Ditto	Incidental							27	10	6					120
		Banker.	As per contra. . . .														
				227	10	3	2	10	3	493	0	9	495	18	1		
		Brought	down from July 31 .	495	18	1							614	5	4		
		Balance	at Bank										1110	3	5		
													121	14	10		
													£1231	18	3		120

Petty Cash, p. 8. Dr. 4

Wages Book, p. 48. 4

The petty cash book, in which the small payments are entered as they occur, a summary being made monthly, and the amounts posted to the credit side of the cash book; the amounts paid being then balanced by a cheque for their exact sum.

The form of cash book now recommended, and the mode of making the entries, is as shown. The entries are supposed to exhibit the receipts and payments during one month, and the balance then in banker's hands.

With proper and not very onerous oversight on the part of the directors where this system be adopted, an *employé* can hardly go wrong, inasmuch as the entries, if correct, must of necessity balance each other, thus:

Petty cash received from the bank is balanced by a similar amount charged against the cashier.

Petty cash in hands of cashier is accounted for by his petty payments.

Cash received is balanced by amounts deposited with banker.

Amounts paid are balanced by cheques presented to banker.

Cash deposited with banker accounted for in part by payments, and balanced by cash in hand.

A comparison of the receipts of any month with that of the corresponding month of the year previous will show whether proper progress is made with, and stimulate to rapid and close collection of, the accounts, as any considerable difference would excite inquiry and remark.

Before the cash account is made up at the end of the month, its correctness should be assured by comparing the amounts shown as received, with the office receipts book, the consumers accounts book, and the ledger; the gross sums of which entries must correspond with the total sum shown by the cash book. The total sum of payments, as shown by the cash book, must be compared—first, with the sum of the payments shown in the sub-ledger, wages book, and petty cash book, and secondly with the ledger. If the totals of either the receipts or payments thus compared do not agree with the total shown by the cash book, an error has been made which must be found and corrected before the cash account can be closed for that month. The balance of cash at bank, as shown by the cash book, must agree with the balance shown by the banker's pass book.

From the cash book the amounts received and paid are posted to the ledger, the accounts therein being stated in order corresponding with that in which the several items are shown by the abstract statement of accounts.

Adopting the mode of accounts thus described, it will be observed that a summary of the entries in all the other books finds its place in the ledger, the respective accounts therein being closed at the appointed times, and the financial position of the company shown by a general balance statement.

WILLIAM DORÉ.

4, *Picton Place, Neath, South Wales, Aug.* 9, 1873.

CONSTRUCTION OF RETORT-HOUSE CHIMNEYS.

SIR,—I read with much interest Mr. Dempster's paper in your last issue, and quite agree with the writer that the chimney has a much more important place than is commonly assigned to it.

With regard to his rules, I am "rather puzzled," and venture to ask if any of your readers can explain the following:—My chimney (fire-brick throughout) agrees nearly with the size named, having an area of 40 square inches per retort for the maximum number at work at once; so also the flues to some ovens of 4 retorts each, the area being 144 square inches, or 36 inches per retort; but I find in practice I have to close them to from 24 to 36 square inches, or from 6 to 9 square inches per retort. If I left them full open, all the coke made would be burnt in them, and the retorts destroyed. My area of fire-bar also agrees nearly with what Mr. D. specifies.

The difference is serious, since all the air required for the furnaces has to pass through about one-sixth of the space mentioned in the paper.

While working with a chimney much too small, I have remarked curious fluctuations of the yield of gas along with the weather. I attributed these partly to the chimney having much more power in certain states of the atmosphere.

ALEX. MILNE.

Lurgan Gas-Works, Aug. 15, 1873.

IMPROVEMENTS IN GAS-WORKS FURNACES.

SIR,—Seeing in your paper of the 12th inst. that a patent had been granted to Mr. J. R. Macfarlane, of Manchester, for an invention relating to the utilization of waste heat of the main flues of gas-works furnaces in heating air for the supply of the same, I beg to inform you that on the 30th of September, 1869, I obtained provisional protection for an exactly similar process, and that I desisted from completing the patent because I found, on an examination of the patent list, that Mr. Frank Hills had several years previously preceded me in all the main principles of the invention.

It is a point to which I think gas engineers might profitably direct their attention, as, although, in endeavouring to advocate its adoption, I have frequently been met by the objection that in increasing the temperature, the quantity of oxygen to a given area of grate-bar would be diminished in proportion to the increased volume of the air; still I believe the more perfect combustion would entirely counterbalance this, and I think experiments have been carried out in iron manufacture which bear out what I state.

I allude to the "Howatson" patent, taken out in 1871, the specification of which, as applied to puddling and heating furnaces for iron, is almost identical with my own, of two years earlier date, as applied to gas-retort furnaces.

18, *Buckingham Street, Adelphi, W.C., Aug.* 14, 1873. A. F. WILSON.

INCREASE OF TEMPERATURE IN A PURIFIER.

SIR,—In answer to "Inquirer," who is at a loss to know why the heating in the purifiers takes place, of which he gives an account in your last issue, I beg to state my views upon the matter, but in hopes that it will be taken up by an abler pen than mine.

The gas, on entering the first purifier is in its almost crude state, or rather, I should say, contains such compounds as the condensers and scrubbers are not capable of arresting; and when the crude gas comes into contact with lime (a portion of which is partly spent), a chemical combination takes place, very probably with the production of water and a slight deposit of tarry matter, and this, according to my ideas, will account for the increase in temperature. Again, after the gas has had a portion of its impurities removed by the action of the first purifier, it must follow that it contains less impurities to be acted upon by the two next purifiers, consequently the chemical combination will not be so great; thus the gas will gradually resume its (inlet or) original temperature. I have never yet seen any purifiers after working which did not contain a small quantity of water or tarry matter, the cause of which I attribute to the chemical change taking place therein. Probably the gas may hold in suspension a small quantity of aqueous vapour carried along with it from the scrubbers.

A YOUNG GAS MANAGER.

[Our youthful correspondent is correct, the cause of the rise of temperature in the purifier lies in the chemical changes which take place therein—the mutual reaction of lime and sulphuretted hydrogen, which produces sulphide of calcium and water, and the absorption of carbonic acid to form carbonate of lime. The fact that no heat was developed in the second would seem to show that the purification was complete in the first purifier.—ED. J. G. L.]

SIR,—In answer to "Inquirer" the heat in the purifiers, I believe, arises from the chemical combination that takes place between the impurities of the gas and the lime; and as the bulk of the impurities are removed by the first purifier it is there that the principal part of the heat is developed. "Inquirer" may readily prove that chemical combination produces heat by adding a little sulphuric acid to some water. Cold may also be produced by similar means, and is continually done with freezing mixtures. The water is also formed (more or less) by the combination that takes place, the sulphuretted hydrogen combining with the hydrated lime to make sulphate of lime and water—thus:

$$\underset{\text{Slacked lime.}}{Ca\,O\,H_2O} + \underset{\text{Sulphuretted hydrogen.}}{2H_2S} = \underset{\text{Calcic sulphate.}}{Ca\,SH_2S} + \underset{\text{Water.}}{2H_2G}$$

and the carbonic acid to make carbonate of lime (chalk) and water, thus:

$$\underset{\text{Slacked lime.}}{Ca\,O\,H_2O} + \underset{\text{Carbonic acid.}}{CO_2} = \underset{\text{Calcic carbonate.}}{Ca\,OCO_2} + \underset{\text{Water.}}{H_2O}$$

The water is probably given off as vapour, and being carried with the gas to the following, and cooler purifiers is there condensed. The tar, I imagine, arises from the hydrocarbon vapours, which, with a little water vapour, are carried over from the condensers.

TOBIAS CANUS.

EVERIST'S EXHAUSTER GOVERNOR.

SIR,—I have read the description and illustrations of Laidlaw's combined self-acting bye-pass and compensator given in your last issue of the JOURNAL.

The principle of the above apparatus appears to be identical with that of an exhauster governor patented by myself, which will be found fully described and illustrated at page 546 of vol. 17 of the JOURNAL OF GAS LIGHTING, July 21, 1868.

An advantage in favour of my governor, and (considering the special service for which it is devised), to my mind, a most important advantage, is the fact that, under no circumstances, there can be any escape of gas.

By inserting this in your next number you will greatly oblige,

531, *Oxford Street, W.C., Aug.* 14, 1873. H. T. EVERIST.

"UNACCOUNTED-FOR GAS."

SIR,—With reference to Mr. Good's suggestion upon the above subject in your last issue, permit me to observe that many managers of gas companies are accustomed to measure the value of their work by the number of cubic feet of gas they are able to produce from a ton of coal. Now, sir, I contend that, although for many purposes this is all very well, the real test of a manager's efficiency is, not so much the quantity produced per ton as, the quantity sold per ton of coal carbonized. I think this also is the crucial question with respect to many of the new (?) gas schemes just now before the public—the quantity paid for as against the quantity produced.

Gas-Works, Lewes, Aug. 21, 1873. WM. WRIGHT.

[We quite agree with our correspondent, that the gas sold per ton of coal carbonized is the crucial test of successful management.—ED. J. G. L.]

Miscellaneous News.

IMPERIAL GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly General Meeting of the Proprietors of this Company was held at the Office, John Street, Bedford Row, on Thursday, Aug. 21—E. VAUGHAN RICHARDS, Esq., Q.C., the governor, presiding.

The SECRETARY (Mr. Harry Chubb) having read the notice convening the meeting, the seal of the company was affixed to the register of proprietors, and the following report and statements of account were presented:—

Your directors have to report that the rise in the price of coal and other materials, as well as in the cost of labour, having continued, the manufacturing expenses of the company have necessarily been increased thereby.

Owing, however, to the partial existence, during the past half year, of contracts for coal entered into before the great rise in the cost of that material, and also to the enhanced price which the company have been able to obtain for their coke and other residual products, the revenue of the company has not hitherto been so seriously affected as might otherwise have been the case; but your directors, in order to ensure a sufficient supply of coal for the current year's consumption, have felt compelled to enter into contracts at prices far higher than those to which they have hitherto had to submit.

The cost of manufacture has been further increased, during a portion of the past half year, by the necessity which has arisen for adopting a new and more expensive process of purifying gas from sulphur.

Under the provisions of the Company's Act of 1869, certain referees were to be appointed by the Board of Trade, who were, among other things, to prescribe the maximum quantity of sulphur which the company's gas might contain. In March last the referees fixed upon a maximum, to be enforced after the 30th of June; this involved many experiments, which ultimately proved that the order of the referees could not be complied with until the purifying apparatus at each of the company's works was greatly enlarged, and this it was impossible to do within the allotted time. Under these circumstances the referees were urgently appealed to, and they were induced so far to modify their order as to raise the prescribed maximum to a limited degree through the ensuing winter.

A compliance with the maximum as first prescribed, if insisted upon, will not only further increase the cost of manufacture, but will entail a large outlay of additional capital for new plant. It will also necessitate the removal of some retort-houses and other buildings, at two of the company's existing works, in order to make room for that plant, and thereby materially reduce the manufacturing power of those works.

With reference to the accounts of the past half year, however, it is satisfactory to report that the ordinary dividend of the company may be maintained by taking from the reserve-fund the sum of £7829 19s. only.

After withdrawing from the reserve-fund the sum needed on the present occasion, that fund will still amount to £67,595 14s. 8d.; and it may be assuring to the shareholders to be reminded that the Imperial Gas Act provides a tribunal for revising the price which the company may charge for gas within certain limits, whenever it is found that the existing price is insufficient, with due care and management, to pay the maximum rates of dividend.

One of the metropolitan gas companies, whose Act is nearly similar to the Imperial Gas Act in this respect, has already tested the value of these special provisions by appealing to commissioners appointed by the Board of Trade, who have admitted the equity of raising the price of gas in such an emergency as the present, and authorized an increase in the case of that company to the extent of 7d. per 1000 cubic feet; and it will be the duty of your directors to make the like appeal whenever it shall appear to them that the interests of the shareholders require it.

In consequence of the necessity for enlarging the new works at Bromley to meet the deficiency of manufacture occasioned at the existing works, and for providing additional purifying plant, the directors have been obliged to make calls for the balance of the £325,000 share capital created in August, 1872, and to raise all the money they are at present authorized to borrow on the company's bonds. There is still a further amount of £325,000 of share capital which the company is empowered to raise under the Act of 1869, and the directors expect that this additional capital must be issued early in the ensuing year.

The bill promoted by the company in the late session of Parliament, and approved of by the shareholders at the meeting in February last, the object of which was to confer on the company permissive power to amalgamate with any other metropolitan gas company, was rejected by the special committee of the House of Commons to which it was referred. This bill was promoted, as the shareholders are aware, entirely in deference to views repeatedly expressed by committees of Parliament, and by governmental and local authorities representing the public. The committee of last session, however, in rejecting the bill, have relieved the company from any imputation of unwillingness to comply with the previously expressed views of Parliament on the subject.

It is with regret the directors have to announce that they have been deprived of the valuable assistance of two of their oldest colleagues—viz., Mr. Lewis Cubitt and Mr. C. W. Christie, the former by retirement, in consequence of failing health, and the latter by death. The directors have selected from among those shareholders who are candidates for a seat at the board, Mr. George Pownall and Mr. Thomas Paine, to fill the vacancies thus occasioned.

It will be observed that notice has been given of a proposal to increase the remuneration to the auditors, the amount of which has not been altered since 1854.

IMPERIAL GASLIGHT AND COKE COMPANY.

Statements of Account for the Half Year ending June 30, 1873.

No. 1.—STATEMENT OF STOCK AND SHARE CAPITAL, *on June 30, 1873.*

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Maximum Dividend authorized.	No. of Shares issued.	Nominal Amount of Share.	Called up per Share.	Total paid up.	Amount issued but not paid.	Remaining to be issued and called up.	Total Amount authorized.
17 Vict., cap. 55.	Stock.	10 per cent.	..	..	..	£1,560,000 0	..	..	£1,560,000
29 & 30 Vict., cap. 352.	Share.	7 Ditto.	52,000	£12 10 0	£12 10 0	649,785 0	£215 10	£455,000	1,300,000
32 & 33 Vict., cap. 128.			26,000	12 10 0	7 10 0	194,962 10	37 10		
						£2,404,747 10	£252 10	£455,000	£2,860,000

No. 2.—STATEMENT OF LOAN CAPITAL, *on June 30, 1873.*

Acts of Parliament authorizing the Loan Capital.	Description of Loan.	Rate per Cent. of Interest.	Total Amount borrowed, June 30, 1873.	Remaining to be borrowed.	Total Amount authorized.
17 Vict., cap. 55.	Bonds for profits capitalized.	10 per cent.	£130,000	..	£130,000
	Debentures	4 to 5 ditto.	43,000	..	43,000
29 & 30 Vict., cap. 352. 32 & 33 Vict., cap. 128.	Ditto	Ditto.	162,150	162,850	325,000
			£335,150	£162,850	£498,000

No. 3.—CAPITAL ACCOUNT.

To Expenditure, to Dec. 31, 1872			£2,540,110 0 5	By Consolidated Stock (1871)	£1,560,000 0 0	..	£1,560,000 0 0
Since that date—				Ditto £12 10s. Shares (1866)	325,000 0 0	..	325,000 0 0
New buildings and machinery in extension of works	£49,984 9 0			Ditto £12 10s. ditto (1870)	324,735 0 0	£50 0 0	324,785 0 0
New and additional mains and services	8,810 10 0			Ditto £12 10s. ditto (1872)	129,540 0 0	65,422 10 0	194,962 10 0
		58,794 19 0			£2,339,275 0 0	£65,472 10 0	£2,404,747 10 0
Total expenditure		£2,598,904 19 5		Bonds for capitalized profit	130,000 0 0	..	130,000 0 0
Balance		140,992 10 7		Debentures	204,150 0 0	1,000 0 0	205,150 0 0
		£2,739,897 10 0			£2,673,425 0 0	£66,472 10 0	£2,739,897 10 0

No. 4.—REVENUE ACCOUNT.

To Manufacture of gas—				By Sale of gas—		
Coals, including dues, carriage, unloading, &c.	£225,653 5 3			Per meter (1,551,221,000 cubic feet)	£288,926 17 11	
Purifying materials, oil, and sundries	4,043 11 11			Public lighting and under contracts	34,492 2 4	
Salaries of engineers and officers at works	2,413 16 6					£323,419 0 3
Wages (manufactory)	31,777 16 9			Meter-rental		7,797 4 6
Repairs and maintenance of works and plant, machinery, apparatus and tools, materials and labour—less £2018 0s. 3d. received for old materials	35,336 9 1			Residual products—		
		£299,224 19 6		Coke, less charges	110,755 17 4	
Distribution—				Breeze	277 16 4	
Salaries and wages of officers connected with distribution	5,307 8 8			Tar	9,208 6 2	
Repairs, maintenance, and renewals of mains and services, including materials, paving, and labour	4,469 1 10			Ammoniacal liquor	8,069 3 3	
Meters—repairs and renewals	5,561 18 1					128,331 3 1
		15,338 8 7		Rents receivable		833 12 3
Public lamps—				Transfer fees		50 17 6
Lighting and repairing		7,443 10 7				
Rents, rates, and taxes—						
Rents payable	1,478 16 11					
Rates and taxes	7,059 7 8					
		8,538 4 7				
Management—						
Directors allowance	2,000 0 0					
Company's auditors	78 15 0					
Salaries of secretary, accountant, and clerks	5,109 1 9					
Collectors commission	4,956 5 9					
Stationery and printing	1,650 0 3					
General charges and incidentals	1,458 17 1					
		15,252 19 10				
Law and parliamentary charges—						
Parliamentary charges	472 4 1					
Law ditto	237 15 3					
		709 19 4				
Bad debts		2,409 5 6				
Gas referees and official auditor	504 3 7					
Public testing-offices	409 12 7					
		913 16 2				
Total expenditure		349,831 4 1				
Balance, carried to profit and loss account (No. 5)		110,600 13 6				
		£460,431 17 7				£460,431 17 7

No. 5.—PROFIT AND LOSS ACCOUNT (NET REVENUE).

To Interest on bonds and debentures, to June 30, 1873	£11,045 6 11	By Balance from last account	£98,295 7 9	
Ditto on temporary loans	998 18 0	Amount drawn from reserve-fund	3,956 12 9	
Balance	99,356 10 0		102,252 0 6	
		Less dividend for the half year	102,252 0 6	
		Amount from Revenue Account (No. 4)	110,600 13 6	
		Interest on moneys deposited	1 5 6	
		Dividend on contingency-fund, invested in Consols	798 15 11	
	£111,400 14 11			£111,400 14 11

No. 6.—RESERVED FUND.

To Profit and Loss Account to make up deficiency for dividend in previous year	£3,956 12 9	By Balance from last account	£78,159 19 11
Balance	75,425 13 8	Dividends on Consols	1,222 6 6
	£79,382 6 5		£79,382 6 5

No. 7.—CONTINGENCY-FUND.

To Balance	£50,000 0 0	By Balance from last account	£50,000 0 0

No. 8.—STATEMENT OF COALS.

Description of Coal.	In Store, Jan. 1, 1873.	Received during Half Year.	Carbonized or used during Half Year.	In Store, June 30, 1873.
	Tons.	Tons.	Tons.	Tons.
Newcastle	28,518	209,971	190,061	48,428
Cannel	4,818	10,665	11,538	3,945
	33,336	220,636	201,599	52,373

No. 9.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In Store, Jan. 1, 1873. Estimated.	Made during Half Year. Estimated.	Used in Manufacture during Half Year. Estimated.	Sold during Half Year.	In Store, June 30, 1873. Estimated.
Coke—chaldrons of 36 bushels	13,688	201,596	57,902	156,097	1,285
Breeze—ditto	1,984	28,357	..	29,992	349
Tar—Gallons	233,820	1,785,214	..	1,970,310	48,724
Ammoniacal liquor—butts of 108 gallons	2,842	32,466	..	34,858	450

No. 10.—BALANCE-SHEET.

To Capital, for balance per account (No. 3)	£140,992	10	7	By amount invested in Three per Cent. Consols—			
Reserved fund, for amount of account (No. 6)	75,425	13	8	Reserved fund	£74,203	7	2
Contingency-fund, ditto (No. 7)	50,000	0	0	Contingency-fund	50,000	0	0
Interest due to June 30, 1873, on bonds and debentures	10,707	13	6	Cash at bankers	52,431	0	8
Sundry tradesmen and others, for amount due for coals, stores, &c., to June 30, 1873	54,520	2	2	Gas and meter rental, for amount due to company, to June 30, 1873	135,153	9	7
Profit and loss, for balance of account (No. 5)	99,356	10	0	Coke and other residuals, ditto	11,231	0	2
				Sundry accounts, ditto	11,556	19	3
				Coals, for stock on hand	61,680	6	6
				Coke and breeze, ditto	1,502	13	9
				Tar and ammoniacal liquor, ditto	431	4	11
				Sundry stores, ditto	32,812	7	11
	£431,002	9	11		£431,002	9	11

We have examined the above accounts, and certify them to be correct. { W. Hawes, Robert Mansel. } *Auditors.*

I hereby certify that the above accounts are correct, and that there are no losses or forfeitures to be deducted.

Chas. H. Parkes, *Official Auditor.*

The Governor, in moving the adoption of the report, said: Gentlemen, those who had the misfortune to be here in February last will recollect that I inflicted a very long speech upon the meeting. My justification at that time was that there had been a stokers strike, a matter of great interest to the gas world, and to all those who hold property in gas companies; and as this strike was then of recent date, I thought you would like to hear an account of it in detail. In addition to that we had been flooded, with prospectuses of inventions for improving the manufacture of gas, all of which I thought you ought to know had been under our attention although we knew them well as old acquaintances under new names. I am thankful to say I have none of these matters to bring before you on the present occasion, and therefore I shall atone by the brevity of my remarks at this meeting for having been so prolix at the last. Gentlemen, the report and accounts—and I may say it without being charged with a want of delicacy, seeing that I was absent from town during the time of their preparation—contain really every thing that I could possibly tell you as to the state of your affairs. The accounts show that we have to take from the reserve-fund, in order to pay our full parliamentary dividends, the sum of £7829. I cannot conceive that anybody who has watched the state of the coal and labour markets for the last six months will be surprised that we are obliged to take something from our reserve-fund on this occasion to make up our full dividend. For my own part, I had made up my mind that we should have to take from it not less than £10,000, and so far I am glad to find that the actual sum required has not come up to the standard of my anticipations. With regard to the report generally, I do not think that there is anything to which I need call your attention except the sulphur question. Now the sulphur question has been to us, in the course of the last six months, an exceedingly troublesome question. Certain gentlemen have been appointed by the Board of Trade, under the City of London Gas Act, 1868 (which was made applicable to this company by our own Act of 1869), whose business it is to determine the quantity of sulphur which shall be permitted in every 100 cubic feet of gas. They have determined that we shall be compelled to supply our gas with not more than 25 grains per 100 cubic feet, and we find it extremely difficult to do so. We are obliged to purify with lime to a very large extent, and to purify with lime occupies a great deal of space. We have at the Fulham works space sufficient to extend our purifying system, but at the other two stations—St. Pancras and Shoreditch—we are so crowded that we cannot give the additional space for purifying purposes without sacrificing manufacturing space. To reduce our manufacturing power at those two stations puts us to the necessity of immediately developing our works at Bromley to an extent which we did not anticipate, and that is the form in which the expense will fall upon us—the bringing into use the Bromley works at once, and the expenditure thereon of extra capital. It is this which rendered necessary the two calls of which you have all received notice, the interest on which will represent the expense to which we are put in consequence of the requisition of the referees. With regard to the referees, I am far from saying that they are not perfectly justified, from their point of view, in making these requirements. They say, in relation to the expense, "We have nothing to do with that;" but whether the public, when they understand the cost to which we shall be put in yielding obedience to these instructions, will think it altogether worth the expense, I very much question. I am not prepared at the present moment to pledge myself as to what that expense will be, but it looks very much like 10d. per ton of coal, which, of course, in these hard times, when we find it difficult to make the two ends meet, becomes a serious item. At the same time, I should be doing injustice to the gentlemen who at present hold the office of referees if I did not say they are gentlemen of position, gentlemen of high character, and that they have throughout met us and considered our difficulties in a spirit of the most conciliatory courtesy. I am bound to say so, and they are gentlemen well known; the name of one of them especially is as well known as that of any gentleman of high position in the scientific world. I only say that, while they have nothing whatever to do with the question of expense, we have to look at the matter from a commercial point of view, and I cannot help thinking that the British public will find that they have to pay a little too dear for what, after all, is not a very serious inconvenience. I mean to say I do not believe that 5 or 10 additional grains of sulphur is the very serious practical evil which it is supposed to be. The serious part of the matter is this, that the referees have the quantity of sulphur absolutely and entirely under their own control, and if we should succeed in reducing the sulphur in our gas to 25 or 20 grains per 100 feet, there is nothing to prevent them putting on the screw and demanding some greater reduction hereafter. I am bound to say, with regard to the present referees, they are gentlemen of such a character and position that they are likely to do conscientiously what they believe to be right, and are not likely to act unjustly to the companies in a spirit of truckling subserviency to certain local municipal authorities, of whom I do not wish to speak, except in terms of befitting respect. I have stated that it is necessary to bring our Bromley works into earlier operation than we originally intended, and this involves some serious considerations. I turn now to purely domestic matters. It was necessary to have a new engineer and a competent staff for those works, and we have been for a long time past of opinion that it was extremely desirable so to work our concerns as gradually to bring the whole of the engineering department under the control of one individual. You must be aware that our works have gradually grown up, and that we have had an independent engineer at St. Pancras, at Shoreditch, and at Fulham. When, however, Mr. Methven ceased to hold office at St. Pancras, we appointed Mr. Joseph Clark to the charge of that station as well as to that at Shoreditch, Mr. Kirkham having charge at Fulham; and we have always had it in mind that whenever one of those two gentlemen left the service of the company, we would so work the matter as to bring the engineering department under one man, having a good and competent resident engineer at each of the several works—captains of companies, with the head engineer as colonel of the regiment—letting each of those men work independently, one against another, but all recognizing the supreme authority of the head engineer, who we now propose should have his office at John Street, so as to be in immediate communication with our friend Mr. Chubb, whom we regard as the head of the whole concern. As we were considering the development of the Bromley works, and how they should be managed—because, of course, the *amour propre* of these two gentlemen standing on equal footing had to be considered—we received a letter from our old friend Mr. Joseph Clark, stating that with the lapse of time he was beginning to feel the increase of infirmities, and that, after 43 years service in the Imperial Company, he must ask permission to retire. I do not believe any man ever gave better service to an employer than Mr. Joseph Clark has given to the Imperial Company. He began at the Shoreditch works when the annual expenses there amounted to £1250 only, and he now leaves it at a time when we think little of paying £1000 for a week's wages. Under his eye the Shoreditch works have entirely developed to the present day, and he now asks permission to retire from their charge. We propose that he should retire as from Michaelmas Day next, and, as no man after a long period of service can be expected to retire without some recognition, we propose that he shall retire upon what the Government has almost recognized as a proper allowance—viz., two-thirds of the salary he has hitherto received from the company. I unhesitatingly say that no man ever deserved it better from an employer than Joseph Clark does from us. I am sure that the feeling I have expressed respecting him is shared in by all my colleagues, and I feel equally sure that the proprietors at large will heartily sanction the course we intend to pursue. I believe nothing more now remains to be said, except with reference to the subject mentioned in the last paragraph of the report. The auditors have represented to us that they think the time has come when they may not unreasonably ask for some addition to the 75 guineas allotted to each of them for his services in the year 1854. When I tell you that in December, 1854, our revenue amounted to £300,000, and that in June, 1873, it amounted to £877,800; that in 1854 our capital was £650,000, and that in 1873 it is £2,400,000, I believe you will be of opinion that the modest addition of 25 guineas to each of our auditors is not an unreasonable thing. It is a matter for your consideration. The auditors are your servants, but allow me to say you must not expect to retain good servants without you give them an adequate remuneration. If 75 guineas each was fair and reasonable in 1854, I confess I do not think 100 guineas is unreasonable in 1873. The suggestion, of course, comes originally from the auditors themselves, but I certainly recommend it to you as what we on this side of the table think reasonable. Having said thus much, I hope you will consider I have kept faith with you, and have made all possible compensation for having taken up so much of your time last February. At the same time I do not think that, by the brevity of my remarks, I have done the affairs of the company any injury, and I close by saying that I shall be happy to answer any inquiry affecting these affairs you may wish to make.

The Deputy-Governor (Mr. Barclay F. Watson) seconded the motion.

Mr. Villeboisnet: The sulphur question is a very important one, and I think the governor, when speaking about the cost of purification, said the company used nothing but lime.

The GOVERNOR: For a long time we used peroxide of iron alone, mixed with sawdust, to make it more porous, but this material will not remove certain compounds of sulphur; lime only will purify gas from those compounds of sulphur. We are, therefore, obliged now to use both oxide of iron and lime, which adds largely to the expense in many ways.

Mr. VILLEBOISNET: The only other remark I make is respecting the auditors. I think, as you have put the matter, the reasons for the proposed addition to their remuneration are unanswerable. At the same time, seeing that our dividends are not fully covered by our profits, and that we have to take £7000 from our reserve-fund, I may suggest to the directors that they should be exceedingly careful, so as if possible not to increase our fixed salaries. With reference to the gentleman who is now retiring after 45 years service, I would remark that I think the Government, in the case of 50 years service, give a retiring allowance equal to the full salary. But this is a question to be left entirely in the hands of the directors, who best know what should be done under the circumstances.

The GOVERNOR: I am sure you will believe that in regard to this matter the directors have acted entirely from a sense of duty, and I may state that Mr. Clark is satisfied with the proposition made.

The motion was put, and carried unanimously.

The GOVERNOR then moved—"That the following dividends be now declared out of the net profits of the undertaking for the half year ending the 30th of June last—viz., at the rate of 10 per cent. per annum on £1,560,000 consolidated stock; at the rate of 7 per cent. per annum on 52,000 £12 10s. shares fully paid, and on 26,000 £12 10s. shares (1872), £5 per share paid from the 1st to the 31st of January, and £7 10s. per share paid from the 1st of February to the 30th of June; that the dividend as above be made payable on Monday, the 6th of September next."

The DEPUTY-GOVERNOR seconded the motion, which was put and carried.

The GOVERNOR: I perfectly recognize the correctness of the remarks made by Mr. Villeboisnet, as to the desirableness of not increasing the fixed expenditure of the company, but, with reference to the remuneration of the auditors, I may observe that you must pay your officers according to the extent of their duties. Having done that, we divide amongst ourselves what the law allows, and our circumstances will admit.

Mr. VILLEBOISNET moved—"That the remuneration of the auditors appointed by the shareholders be increased to 100 guineas each per annum."

Several shareholders rose to second the motion, which, on being put to the vote, was carried unanimously.

A cordial vote of thanks was given to the directors for their attention to the affairs of the company, and the governor having briefly acknowledged the same, the proceedings terminated.

ALLIANCE AND DUBLIN CONSUMERS GAS COMPANY.

A Special General Meeting of Shareholders was held on Monday, Aug. 18—Alderman MOYLAN in the chair—pursuant to a requisition bearing the signatures of shareholders representing one-tenth of the paid-up capital of the company, for the following purposes, as therein set forth, viz:—

1. To declare that, in consequence of the unsatisfactory position of the affairs of the company at present and for some time past, as proved by the evidence recently given before a committee of the House of Commons, the present board of directors does not possess the confidence of the shareholders of the company; and if all or any of said board should resign their office, to take or recommend proceedings for the election or nomination of their successors, pursuant to the statute.
2. To resolve that no directors henceforward to be elected, nominated, or appointed, shall receive any remuneration unless and until the shareholders receive a dividend of not less than £6 per cent. per annum out of profits actually realized by the company within the year for which such dividend shall be declared.
3. To resolve that the salary at present paid to the secretary, amounting to £1000 per annum, shall, so soon as such reduction can legally be made, be reduced to such amount as the extraordinary general meeting shall deem just and expedient.
4. To resolve that all contracts for coal, and other supplies required by the company (after the determination of existing contracts), shall be publicly advertised for, with directions that the tenders for such contracts shall be sent in sealed covers, which shall be opened at a board meeting only; and that such tenders shall be accepted or rejected by the directors, but only when assembled as a board.
5. To consider and decide on the steps to be taken in order to remedy the defects in the carbonizing and distributing departments of the company's works, and prevent losses thence arising to the company.
6. To appoint a committee of shareholders to investigate the affairs of the company generally, with instructions to such committee to report the result of their investigation at an adjournment of the said extraordinary meeting, to be fixed thereat.

The SECRETARY (Mr. Stevenson) having read the notice convening the meeting,

Mr. DRIMMIE rose and said: I have been asked by the shareholders committee to move the first resolution, but before doing so I wish to express the hope that whatever discussion may take place here to-day will be carried on with such moderation and restraint as to prevent unnecessary pain to any one present. No doubt, like myself, many of you feel justly indignant at the unfortunate position into which the affairs of this company have drifted, but it is unnecessary and undesirable to indulge in any expressions calculated to wound the feelings of any one connected with the management of the company, or which may possibly be used outside to the prejudice of our property. The resolution which I have to propose is—"That inasmuch as the present directors of the Alliance and Dublin Consumers Gas Company have agreed to place their resignation in the hands of the shareholders on the 30th of September next, we hereby postpone consideration of the first five propositions set out in the requisition for this extraordinary meeting until an adjournment of this meeting, to be fixed hereafter." As this resolution proposes a departure from the programme set out on the requisition for this meeting, and which you have been called together to consider to-day, it is due to you that an explanation should be offered, and with your permission I will now proceed to give that explanation. Since our meeting in the Northumberland Hotel, on the 7th of July last, the position of matters as between the shareholders and the directors has very much changed. At that time there appeared no hope of the directors making any attempt towards meeting the reasonable requirements of the shareholders, and we were consequently driven to resort to extreme measures for the purpose of attaining what we considered necessary for the future welfare of the property, and accordingly the requisition on which this meeting has been called was lodged with the directors. The main object of the requisition was to effect a change in the management, that being what was and is still considered principally necessary in order to place the company in a thoroughly sound and prosperous position, and it is because your committee have already succeeded in placing this within your reach that we now propose to postpone for the present the consideration of the first five propositions detailed in the requisition. You are all aware that the conferences which took place between a deputation from the committee and the directors resulted in the board agreeing to place their resignations in your hands on the 30th of September next, and I may mention that it was under consideration whether their resignation should not be tendered to-day, instead of being deferred until the date for which it has been fixed; but as the election of directors could not take place at this meeting, it was resolved to defer the resignations until the day on which the ordinary meeting will be held, and call a special meeting for that day to elect a new board. Under these circumstances you will agree with me that it is no longer necessary to move a resolution on the first proposition of the requisition. The object of it has been attained quietly, and without the unpleasantness which would result from passing it, and I need not tell you that it is desirable that we should proceed to have what we conceive to be necessary for the improvement of our property carried out as peaceably but as quickly as we can, and without giving any unnecessary offence to those whom we have to deal with. With regard to the remaining propositions which I propose to postpone, I think you will all agree with me that in view of the reconstruction of the board, it is better to defer them for the present. It is not by any means intended to abandon them; but after mature consideration the committee think they are best serving the interests of the company by postponing consideration of them till after the formation of the new board. It is not my intention to make any remarks one way or the other respecting the present directors—this is not an occasion to do so: but I must impress upon you that it is absolutely necessary for you to effect a change in the management of the company; and in endevouring to do so we do not know what effect these proposed resolutions may have. Hence it is that I propose to postpone them for the present, and if any shareholder thinks we are wrong in departing in this way from our original programme, I can only answer him that the committee gave the subject their most careful and mature consideration, and decided that this was the best plan to adopt. In forming a new board we must have gentlemen of the highest standing, who have guided other enterprises to a successful issue, and are thoroughly conversant with the working of such a concern as this—good, practical, business men, who will take a deep interest in the concern, and a pride in bringing it up to the high and profitable position which it is entitled to occupy. In looking for such men as these we must not be hampered with resolutions which we proposed for a board with whose management the shareholders were justly discontented, and therefore it is highly desirable not to proceed with these resolutions just at present. When the new board is formed you can exercise your discretion regarding them, and proceed with them or such of them as you may think proper, if there is any necessity, or if it is then advisable in your own interest to do so; and as the adjourned meeting will be held without any new requisition or notice, you suffer nothing by the proposed delay. I cannot conclude without once more giving you my assurance, formed after most careful and minute investigation, that your property is still a most valuable one; and even though the results of the working for some years past have not been encouraging, yet the establishment is still quite capable of yielding you a larger profit, under even ordinary careful management. This has been demonstrated to you beyond doubt in the first report issued by the committee, and I need not tell you that, such being the case, the remedy lies in procuring good management. Active, energetic, efficient, and careful management will put a stop to all this loss, will probe the sources of it to the bottom, and have the proper remedy applied, and then we shall have large profits and our maximum dividend, besides being able to acquire a respectable invested reserve-fund.

Mr. DARCY seconded the resolution.

Mr. COFFEY, asked whether it was intended to propose any other resolution.

Mr. DRIMMIE: It is intended to move two other resolutions. The next will be for the appointment of a committee, and the third for the adjournment of the meeting.

Mr. COFFEY, said that he and his friends represented about 350 shareholders and many thousands of pounds in the company. He thought they were greatly indebted to Mr. Drimmie and those who had acted with him for the course they had taken, which, he believed, was a wise and prudent course. The committee had made out a *primâ facie* case for a full inquiry. But he could not conceal the fact that there were grave difficulties to be met, which ought to be met cautiously, and he strongly contended that it would very much complicate matters if they proceeded to hamper the newly-constructed board with a committee of inquiry. He suggested that they should not appoint this committee; but reserve the powers they had gained until the meeting on the 30th of September, and then, if they found they had obtained gentlemen as directors in whom they could place confidence, it would be infinitely better to have these men entrusted with the inquiry into the management, and report at the next half-yearly meeting as to the former working and the expected improvements under the new management.

Mr. MACREADY said they had already considered the question, and were of opinion that when the shareholders shall have appointed the proper number of efficient directors, and when these gentlemen shall have been appointed, then the committee shall consider that their occupation has ceased to exist. He believed if the committee existed after the board had been formed, their unity of action would be destroyed; but the question had been taken care of, and the committee would endeavour not to fall into any such mistake.

Mr. COFFEY said the only question was whether they would now, at this meeting, name the committee of inquiry, which might have no functions to discharge at all, or postpone the appointment until they would see whether the other portion of the programme would be carried out.

Mr. DALEY said he represented a large number of shareholders in the country who could not attend. They all knew the difficulty there was of getting persons together for the investigation of figures, or to look into their affairs. In this case a certain number of gentlemen had taken much trouble, and shown much ability in the investigation of their affairs, and he and others looked upon Mr. Drimmie and his friends as the friends of the shareholders. The tone of speeches he had heard to-day did not take him by surprise; they were only what he expected. Mr. Drimmie had made a singularly moderate speech. He had not personally attacked the directors. Any person might charge the directors with having done wrong ministerially—in the same way the Prime Minister might be attacked—but there was no personal charge made. He himself had to find fault with the management, and he would say that they should have from the present price of gas a profit of from 8 to 10 per cent. He thought Mr. Coffey's proposition should be complied with. They were not going to appoint the committee as directors; but they were appointing the committee to assist the directors in investigating the affairs of the company.

Mr. DRIMMIE's resolution was then put and carried.

Sir JOHN GRAY threw out as a suggestion whether Mr. Drimmie's resolution ought not to be proposed as an amendment to some resolution contained in the requisition, so as to give it legal validity. Thus the adjourned meeting would have the full force of the present meeting.

After some discussion on the point of order,

Mr. DALY proposed—"That having the most perfect confidence in the shareholders committee formed at the meeting of shareholders held at the Northumberland Hotel, on the 7th of May last, and being anxious to show our appreciation of their labours in the interest of the shareholders since then, we hereby appoint them the committee of investigation, in pursuance of the sixth resolution in the requisition for this extraordinary meeting."

Mr. O'CALLAGHAN seconded the resolution.

Mr. W. M. JOHNSTON spoke of the ill feeling between the directors and the committee, and the desirability of allaying it, in order that the depreciation of their property might not continue.

Mr. DARCY and Mr. DRIMMIE denied that there was any ill feeling between the directors and the committee, both of whom were working together.

Mr. DRIMMIE hoped the meeting had not been influenced by what Mr. Johnston or Mr. Cree had said with regard to the depreciation in the value of the shares. It had not occurred in consequence of the action of the committee; but this time last year, when the report was issued, the shares immediately went down to a discount. He firmly believed that had the committee not taken every opportunity of showing the public that the undertaking had the elements of success within it, the shares would not even stand at the price which they do to-day.

The resolution was then put and carried.

On the motion of Mr. M'DERMOTT, seconded by Mr. MICHAEL KERNAN, the meeting was adjourned to the 30th of September next.

LIVERPOOL UNITED GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on Tuesday, Aug. 19—Mr. T. EARLE in the chair—when the following report was presented:—

The accounts of the company for the past financial year show the income to have been £367,632 10s. 11d., and the expenditure £324,477 16s. 7d., the latter being upwards of £74,000 in excess of the expenditure during the preceding year; but, on the other hand, higher prices have been obtained for coke and other residual products, making the net increase expense for the year £39,309 12s. 7d. The directors recommend payment to the proprietors of the usual dividend for the half year ending the 30th of June last, namely, at the rate of 10 per cent. per annum on the consolidated stock of the company, and 7 per cent. per annum on the paid-up capital of the new shares. The payment of this dividend will, however, necessitate resorting to the reserve-fund to such an extent as to almost entirely exhaust that fund, and it is obvious that under existing circumstances the statutory rates of dividend cannot be maintained without some increase in the price of gas. The final call of £5 has just been made in respect of the £25 shares already issued under the company's Act of 1865, and the requirements of capital to defray the costs of the new works in progress at Linacre will render necessary the issue of the remainder of the 7 per cent. shares authorized by that Act. Since the last half-yearly meeting, the company have sustained the loss of their treasurer, Mr. Crosby, whose death the directors have much regret in recording. The vacancy thus occasioned has been filled by the appointment of Mr. John Frederick Robinson. The directors retiring by rotation are Sir Hardman Earle, Bart., Messrs. J. G. Morris, William John Marrow, and Richard Houghton, all of whom are re-eligible. The retiring auditor is Mr. D. Owens Bateson, who is also eligible for re-appointment.

The CHAIRMAN moved the adoption of the report and the statement of accounts. After referring to the matters contained in the report with respect to the issue of new shares, he stated that the company had purchased land at Garston for the erection of new works, and new works were also in progress at Linacre. Owing to circumstances, the directors thought it necessary to increase the price of gas; they were very reluctant to resort to such a measure, but it was unavoidable. That step had already been adopted by several other towns, and no doubt it would become general during the winter. The cost of making gas had been very much enhanced during the past few years by unavoidable circumstances. In the case of the Liverpool Gas Company the net increase was £74,000, but that was reduced considerably by the high price they had obtained for coke and other materials. The company had a fair stock of coal and cannel on hand, and he hoped they would be able to get through the winter without that anxiety as regarded their supply which they experienced in common with other large consumers last winter. He believed that everything was conducted as economically as it could be with regard to efficiency; and he was sure their excellent engineer, Mr. King, did all he could for the interests of the company. They had sustained a loss in the death of Mr. Crosby; but his successor, Mr. Robinson, was well qualified for the post, and he conducted his department with regularity and efficiency.

Mr. THOMPSON seconded the adoption of the report, which was agreed to.

In reply to questions, the CHAIRMAN stated that the increase in the price of gas would probably be 3d. per 1000 feet, and that the maximum price to which they could raise it was 4s. 6d. per 1000. With respect to the issue of new shares, they would be offered to the present shareholders at par, unless a special meeting of directors, which was to be held, determined otherwise.

A dividend was declared in accordance with the recommendation contained in the report, and the retiring directors and auditor were re-elected.

A vote of thank to the chairman and directors terminated the meeting.

CAMBRIDGE UNIVERSITY AND TOWN WATER-WORKS COMPANY.

The Ordinary Half-Yearly Meeting of Shareholders was held on Friday, Aug. 15—the Rev. Dr. OKES in the chair—when the following reports and statements of account were presented:—

Your directors herewith transmit the statement of accounts for the past half year, which have been duly audited. They propose a dividend on the consolidated stock and new £3 shares, and on the first call upon the new £2 shares for the half year ending July 6, 1873, at the rate of £6 per cent. per annum, to be paid on the 1st of September next, free of income-tax. To assist in the payment of this dividend, the sum of £114 4s. 1d. is required from the suspense account.

The anticipations of the directors in respect of fuel have been realized, as the present price of it, though less than the maximum attained during the last half year, is considerably higher than it was at the time when their last report was made.

Your directors have reason to expect that the next half year's account will be relieved of some expenses which appear in this. They would, at the same time, call attention to the prospect of additional receipts from two sources; one, the increasing charge for water supply, which at present has been in operation only one quarter; the other, the additional rent now charged for the house on the Cherryhinton estate, the land of which has been permanently let. These two sources of revenue, together with a diminution in the expenditure, will help, it is confidently hoped, to increase the balance of the company's accounts in the right direction.

The engineer and manager's report annexed shows the increase in the company's business.

Engineer and Manager's Report.

Gentlemen,—I have to report that during the past half year water from the company's works has been laid on to 79 premises, the increased rental derivable from which is £86 per annum. The total number of premises now supplied is 5839.

The general condition of the company's works is satisfactory.

(Signed) HENRY TOMLISON, Engineer and Manager.

General Balance of Account, July 6.

Dr.		*Cr.*	
Revenue account	£1,198 10 8	Manager's balance	£47 14 3
Capital account	107 3 9	Water-rates owing	1,361 6 1
Banker's balance	52 6 5	Water accounts (sundries) owing	215 18 10
Unpaid dividends	9 9 1	Fitting accounts owing	678 18 11
Suspense account	779 2 6	Stock in hand	243 14 9
Accounts owing by the company	977 5 9	Rents (ordinary)	38 15 0
		Rents (Cherryhinton estate)	39 18 10
		Transfer fees	1 0 0
		Improvement Commissioners interest	12 2 6
		Improvement (standpost account)	484 9 0
	£3,123 18 2		£3,123 18 2

The CHAIRMAN, in moving the adoption of the reports, said it did not seem necessary that the shareholders should have such an excellent, learned, and explicit exposition of their affairs as was heard at the recent meeting of a neighbouring company. Indeed, if it were necessary, he was sure they would not get it from him. But he was thankful to say that such a necessity did not arise. Considering all the circumstances, they would regard the reports before them as favourable. The second paragraph of the directors report contained an observation about the fuel, which was a matter upon which they could say very little more than they had said, and they must live in hope that there would be a reduction in price. He found upon inquiry that the cost of consumption this half year had been £181 13s. 4d. more than in the corresponding half year of 1872, and £230 16s. 8d. more than in the corresponding period of 1871. They must now leave it to public opinion, as well as to the coalowners and miners, to endeavour to bring more within the compass of moderation the price of fuel in this extraordinary atmosphere of ours in winter. With regard to that part of the report relating to expenses, the law expenses would not be so large in future, because what was now before the company had been running over several years; a considerable item was due to the necessary opposition to the reassessment of their works, from which opposition great results had accrued to the company. He was told that this was not the half year when they expected to divide greatly; it was, therefore, a source of congratulation that they proposed in August a dividend equal to that at the beginning of the year. The engineer and manager's report was short and equally sweet, because it told of a great increase of rental and of the satisfactory condition of the company's works. He thought they might thank their engineer and manager for what he had done and was doing in behalf of the company.

The motion, having been seconded by Mr. MOSES BROWNE, was put, and carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. J. SWAN, the meeting agreed to the dividend recommended by the directors in their report.

Mr. J. EADEN proposed a vote of thanks to the chairman. As to the chairman's allusion to the very long and able speech given in another place, and his own inability, he was happy to say that the circumstances were different. He would rather have a 6 per cent. dividend with a short speech than a 4 per cent. dividend with a long one.

Mr. ELLIOTT SMITH seconded the motion, which was unanimously agreed to.

The CHAIRMAN thanked the meeting for the vote, and said he was not conscious of being worthy of very much praise in conducting the affairs of the company, because they were so well conducted by their officials, so that he had comparatively little to do.

THE METROPOLITAN GAS REFEREES have lately been called on to exercise one of their duties for the first time. The parish of Paddington, wishing to have their public lamps supplied by measurement, have called on them, under Sec. 48 of the Imperial Gas Act, 1869, to "prescribe and certify the mode of ascertaining the quantity of gas consumed by the public lamps." The referees have, we understand, visited various towns where the average meter system is in operation, and have otherwise collected information on the subject; and they have just issued a notification prescribing that the average meter system shall be adopted, with one meter to every twelfth lamp. They direct that the meters shall be of the wet kind, let into the ground, like those at Nottingham, and they add other regulations in matters of detail, with the view of making the system work equitably for both parties.

PHILADELPHIA NEW GAS-WORKS.—We believe that it is an incontrovertible fact that the new gas-works of Philadelphia, whether we consider the amount of capital employed, the extent of the works, the quantity and quality of the gas produced, or the price at which it is furnished to the people, stand unrivalled on this side of the Atlantic, and perhaps in the world. Of the capital employed, the last annual report of the board of trustees, for the year ending December 31, 1872, estimates the total value of the works, as per inventory, at 10,305,537·38 dols., which sum does not include the goodwill or the valuable franchises secured to the corporation by the several enactments of the State Legislature. Furthermore, it is no exaggeration to state that to-day private capital might be found willing and ready to relieve the city of it at double these figures. As early as 1835, the building and operating of these works, now grown to such mammoth proportions, were first considered. At that time the proposition met with some opposition, but this was in a measure quieted; and in March, 1836, a majority of city councils were induced to authorize a loan to the amount of 150,000 dols. to be expended in organizing and getting in operation this much-needed enterprise. At subsequent periods, as circumstances demanded more capital to maintain the enterprise, to extend its capacity in accordance with the growth of the city, and also to complete the purchase of the several district gas-works (which had during the interim been established), at the time of the consolidation of the many adjacent districts with the city proper, other loans were found necessary and authorized. The total amount of capital raised since the establishment of the works in 1835 now foots up 7,120,740 dols. It may be added that none of the loans were sold below par. Of these loans matured and paid there was in amount some 1,370,000 dols., leaving 5,750,740 to become due. The last loan authorized was on Oct. 26, 1871, due Jan. 1, 1902, for 500,000 dols. All these loans pay an interest of 6 per cent. per annum. During the period that these loans were being negotiated, a sinking-fund for the redemption of the same has been maintained; appropriations being yearly made to it out of the net profits of the works. There is now placed to the credit of this fund in the City Treasurer's office 2,172,252·90 dols. as an offset to the debit of those loans to become due, amounting to 5,750,740. The profits of the works for 1872 footed up 548,503.47 dols. Of this amount, 448,418·32 was expended in liquidation of interest on loans and stock, and the balance was passed to the credit of the sinking-fund, being a net profit of 100,085·15 dols. The accumulated net profits since the construction of the works amount to 1,877,888·94, this being used as a working capital, and expended in construction and repair of works, over and above loans created for the purpose. You can judge of the magnitude of these works when I state that there are in constant operation 1345 gas-retorts, yielding about 7,000,000 cubic feet of gas during each and every 24 hours. The total quantity manufactured last year was 1,436,969,000 feet. The largest consumption in any one night was on Dec. 24, amounting to 6,625,000 feet. 584 miles of street-mains have been laid, and about 1200 men are kept constantly employed. In 1836, when the works were first put in operation, the total supply to private families was 2952 lights; public lights, 165. Last year 999,251 private and 9023 public lights were supplied. The price of gas to private consumers is but 2½ per 1000 feet. Meters are furnished free to consumers. The value of coal consumed this season reaches the immense sum of 1,110,861·34 dols., being about equally divided between the Pennsylvania and the Westmoreland Gas Coal Companies. The sum paid for all descriptions of ironwork amounted to nearly 1,500,000 dols. This exhibit of the affairs of the Philadelphia Gas-Works is also given with the hope that it may possibly interest such municipalities as the city of Brooklyn and others at present agitating the question as to the practicability of a city assuming the control and management of gas-works. The main objection to such a course is generally the fear that it would create a "political machine" of immense power, patronage, and influence, and an organization where legitimate "pickings" cold be indulged in to any extent. The "stealing" part, however, could be regulated; and, by taking the Philadelphia management as a model, the facts and figures above given afford ample evidence that it can be made a paying operation, and that the advantages accruing would greatly overbalance all trials and troubles that might possibly arise by reason of political interference. As stated in the commencement of this article, the gas-works at Philadelphia are managed by a board of trustees, elected by the city councils. The board at all times consists of twelve members, four being elected each year, who serve without pay or emolument of any kind. It is believed that in the figures here given ample evidence is presented that they have not violated their trust, and that financially their administration has been a success. Even with the fact admitted and recognized by these trustees, that it is in their power to so manipulate their *employés* as to individually, as well as collectively, advance any political movement they may desire, yet it is equally well known they refrain from exercising such power, and that each *employé*, in his political opinion and action, is left to exercise his own free will. In fact, this gas company is a sort of "civil service reform," which has been quietly organized, and all in power appear to take a pride in having it honourably maintained. When appointments are made from the mass of applicants, the best man for the vacant position is selected; and promotions are made in accordance with abilities exhibited, while good behaviour ensures a retention of position.—*Coal and Iron Record.*

ROWLAND'S IMPROVEMENTS IN RETORT-CHARGING MACHINERY.

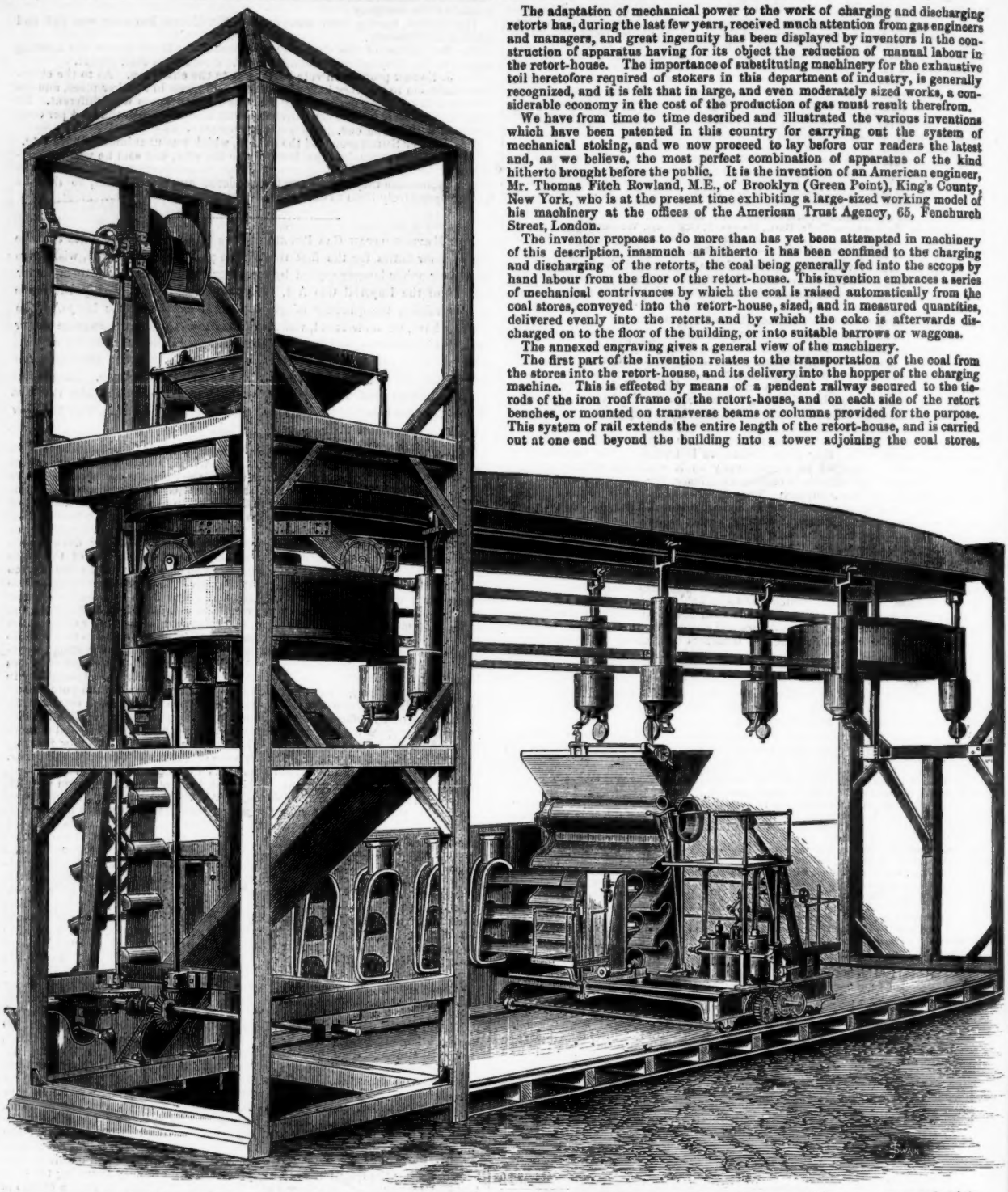
The adaptation of mechanical power to the work of charging and discharging retorts has, during the last few years, received much attention from gas engineers and managers, and great ingenuity has been displayed by inventors in the construction of apparatus having for its object the reduction of manual labour in the retort-house. The importance of substituting machinery for the exhaustive toil heretofore required of stokers in this department of industry, is generally recognized, and it is felt that in large, and even moderately sized works, a considerable economy in the cost of the production of gas must result therefrom.

We have from time to time described and illustrated the various inventions which have been patented in this country for carrying out the system of mechanical stoking, and we now proceed to lay before our readers the latest and, as we believe, the most perfect combination of apparatus of the kind hitherto brought before the public. It is the invention of an American engineer, Mr. Thomas Fitch Rowland, M.E., of Brooklyn (Green Point), King's County, New York, who is at the present time exhibiting a large-sized working model of his machinery at the offices of the American Trust Agency, 65, Fenchurch Street, London.

The inventor proposes to do more than has yet been attempted in machinery of this description, inasmuch as hitherto it has been confined to the charging and discharging of the retorts, the coal being generally fed into the scoops by hand labour from the floor of the retort-house. This invention embraces a series of mechanical contrivances by which the coal is raised automatically from the coal stores, conveyed into the retort-house, sized, and in measured quantities, delivered evenly into the retorts, and by which the coke is afterwards discharged on to the floor of the building, or into suitable barrows or waggons.

The annexed engraving gives a general view of the machinery.

The first part of the invention relates to the transportation of the coal from the stores into the retort-house, and its delivery into the hopper of the charging machine. This is effected by means of a pendent railway secured to the tie-rods of the iron roof frame of the retort-house, and on each side of the retort benches, or mounted on transverse beams or columns provided for the purpose. This system of rail extends the entire length of the retort-house, and is carried out at one end beyond the building into a tower adjoining the coal stores.



Both ends are connected by semicircular rails, thus forming an endless line. From this railway is suspended a series of buckets attached to a flexible steel belt, by which they are separated and kept at uniform distances apart. The belt passes round horizontal drums at each end of and below the line of rails. These drums are 10 feet in diameter, their vertical shafts being in the centre of the curved rails. The drum at the receiving end is placed within the tower, and is caused to revolve by a suitable steam-engine. Its double duty is to cause the belts with their attachments of pendent buckets to travel to and from the retort-house, and it affords an effective means by which the buckets are successively filled with coal. The drum at the opposite end, which is an idler, simply transmits and gives a return direction to the belt to which the pendent buckets are attached. The coal is raised from the ground into a receiving pocket in the tower by means of a bucket and belt arrangement, and it is provided that, as it passes into this elevator, it may run through rolls for the purpose of sizing and mixing the material.

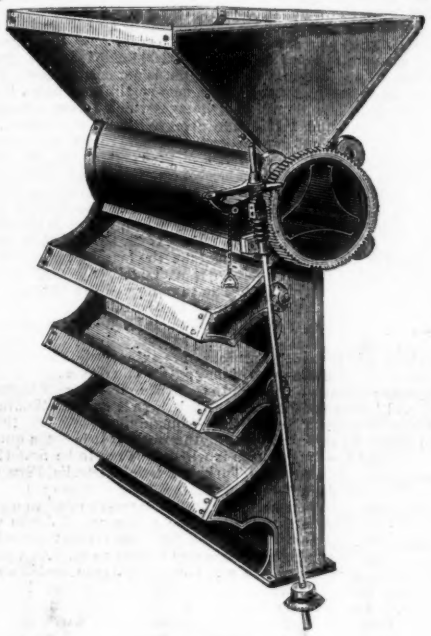
The pendent buckets are vertical cylinders, one-half of their upper parts being cut away, so that, as they come in contact with the drums, this portion of the bucket covers the shoot opening therein, and forms a close connexion for the coal to travel from the fixed cylindrical pocket or hopper above. The distance asunder at which they are attached to the belt is equivalent to the semi-circumference of the revolving drums. Thus, when the drum revolves, one bucket is coming in contact with its periphery at the moment of time when the preceding bucket is leaving the same. During the time a bucket is in contact with the revolving drum (being the time of half a revolution) the speed of each is coincident, and their relation to each other is equivalent to a state of rest. At this moment the coal is conveyed from an upper pocket into the bucket. The drum is provided with diagonal chutes (one opposite the other) leading from a common centre above the drum to openings in its periphery. The apex of these chutes is cylindrical in form, into which the spout of the upper receiving-pocket terminates. Each diagonal chute is provided with two valves, the edges of which are armed with steel blades, to shear any coal which might otherwise tend to clog their action. These valves are opened and shut by suitable connexions receiving their motion from a cam or cams secured to the central shaft. Their office is to allow a quantity of coal to enter the chutes at each revolution of the drum, and to deposit the same in the bucket which is in contact with the periphery of the drum. The capacity of these pendent buckets is about 3 cwt., their distance apart about 15 feet 6 inches, and they may be made to travel with a velocity of 100 feet per minute.

The next part of the invention relates to the means of accurately measuring out the proper quantity of coal for a charge, and placing it in the proper charger. This is accomplished by the employment of a broad stout car, which traverses the entire length of the retort-house on rails secured to the floor, and set to a 12-feet gauge. It is self-propelling, the necessary power being furnished by the boiler and engines mounted thereon for the purpose of performing the various functions of the machine. Midway upon the car, and between the "charger" and discharger," is located the "meter," whose office it is to receive the coal from the buckets of the "pendent railway" as they pass, separate it into quantities suitable for each retort, and deposit it into the scoops of the "charger."

This operation is performed as follows—viz., there is a trip-wheel mounted

on the edge of the meter hopper, which, coming in contact with the trip-latch of the pendent coal buckets as they traverse the building, releases the bottom of the buckets as they arrive over the hopper, allowing the coal to fall therein. When the hopper is full, the trip-wheel is drawn aside, allowing the buckets to pass untripped until they arrive at the hopper of the next machine, should two or more be in operation on the same line of track. Should neither of the machines require coal for a long time, the engineer in charge of the "pendent railway"—who should stand where he can see the hopper or hoppers, and also any signals which may be made by the attendants at the car or cars—will slow or stop the motion of the buckets until more coal is needed.

The meter has a revolving cylinder divided by longitudinal partitions into three parts, each part having a capacity equivalent to the amount of coal required for one retort. There are openings in each division of the revolving cylinder, communicating in turn with an opening in the bottom of the coal pocket or hopper, and as the cylinder revolves each division in turn is filled with coal. The edges of the openings both of the cylinder and of the coal pocket are furnished with steel blades, which, acting as shears, cut away any

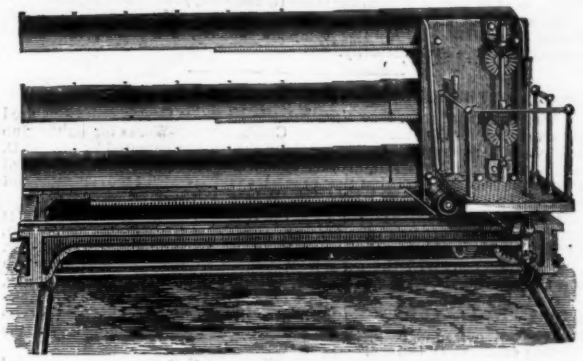


COAL-METER.

coal which might otherwise tend to clog the revolving cylinder. When the cylinder has revolved one-third of its circumference, the coal deposited in the first division finds an outlet, and is dumped on an inclined plane which leads directly to the top scoop of the charger. The next third of a revolution deposits the contents of the second division, which is prevented from following the course of the first, and forced to travel into the middle scoop by means of an automatic arrangement, which at the proper time removes a portion of the upper inclined plane, and presents the inclined plane for the middle scoop to the catch of the coal. The remaining third revolution deposits the coal of the third division. It is guided to the lower scoop by the automatic removal of a portion of the second inclined plane, allowing the inclined plane of the lower scoop to be presented to the catch of the coal.

The third part of the invention relates to the charging machinery.

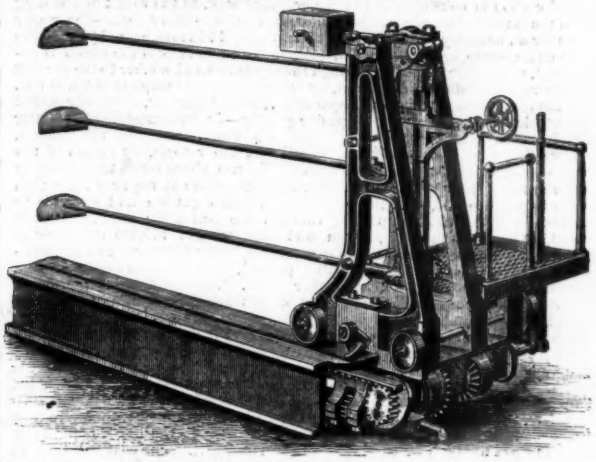
The charger consists of a carriage mounted on wheels, which traverse the main car transversely to the line on which the main car itself travels. This carriage is provided with three scoops, placed one above the other, at distances corresponding to the vertical measure between the retorts. These scoops are of a form similar to the shape of the retorts, and are provided with movable bottoms, controlled by suitable racks and pinions. When the scoops are filled with coal from the meter the carriage is thrust forward, and while the scoops are within the retorts the bottoms are withdrawn, thus allowing the coal to fall in even layers on the retort bottoms. The carriage is then drawn back, this action causing the sliding bottoms to be replaced, when again the scoops are ready to receive the charges from the meter.



CHARGING APPARATUS.

The fourth part of the invention relates to means for drawing out the coke.

The discharging apparatus is on a carriage traversing across the main car, like that already described, and is provided with three rakes. By an automatic device these rakes are made to produce the motion and draw the coke in the same manner that it is now done by hand labour, but with greater despatch, as three retorts are discharged at the same moment of time.



DISCHARGING APPARATUS.

The steam-engine or engines carried on the carriage operates mechanism to thrust the charger and discharger backwards and forwards, withdraw the bottoms of the scoops, revolve the meter, set the separating valves of the inclined planes, and traverse the entire machine, as required, from one tier of retorts to another, and then from bench to bench.

The machinery is so arranged that the work of discharging the coke from one tier of retorts and the charging of the coal into another tier of retorts can proceed at one and the same time.

The metering of coal into scoops may be done while the machine travels from tier to tier.

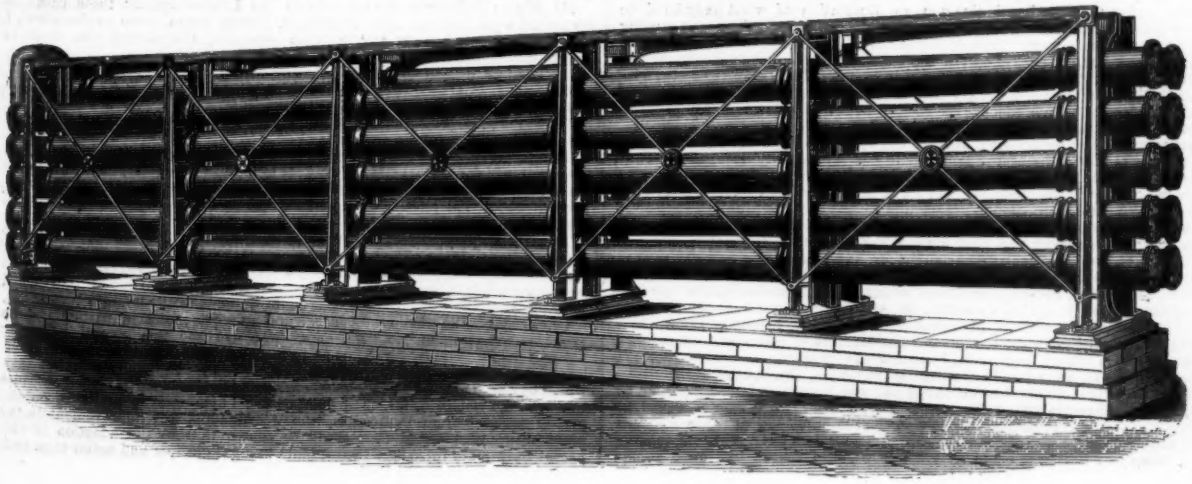
GRAHAM'S HORIZONTAL CONDENSER.

The annexed engraving is copied from a photograph of a new set of horizontal condensers which have been erected at one of the stations of the Stalybridge Gas Company, from the plans of Mr. D. A. Graham, the manager of that company.

This arrangement of condenser was first proposed by Mr. Graham in the columns of the *Engineer* several years ago, and has since been adopted by several large companies. It consists simply of a large flat screw, along which all the tar and ammonia water made in the process of distillation passes with the gas through the entire length of piping, the object being not only to cool the gas preparatory to scrubbing and purifying, but to naphthalise it with the naphtha present in the tar, and also to remove a considerable portion of the ammonia previous to scrubbing. The ammonia water, which gravitates along with the tar, and in contact with the gas, leaves the condenser of a strength equal to 5° Twaddle, a result which is considered highly satisfactory.

The application of this condenser has very perceptibly increased the illuminating power of the gas from the same class of coal, and the scrubbers and purifiers have been found to do their work much more efficiently.

This condenser is 65 feet long, and contains 650 feet of 16-inch piping, which



together with the inlet and outlet pipes bring up the condensing surface to 4000 superficial feet. The nozzles in the scrubbers at the outlets of the pumps have been reduced to ½ inch diameter. The small stream is dashed into spray, and prevents any large deposition of absorbed or other naphtha in the passage of the gas through the scrubbers. The joints are of the turned and bored description, and are filled up with cement. Blank flanges are bolted in each length, so as to permit of cleaning them (if necessary) easily and rapidly.

The work was finished by Mr. Gimson, engineer of the Staley Engine-Works, Stalybridge, in a most complete manner, and the apparatus has been found to work satisfactorily.

THE NEW GAS COMPANY AT CHICHESTER.

It was announced some time ago that the New Gas Company had entered into arrangements with the lessee of the Chichester Gas-Works for lighting up the city of Chichester with gas prepared by the process patented by Mr. W. D. Ruck, and purchased by them, in order to demonstrate to all persons interested in the manufacture of gas that that process could be applied practically and economically to existing gas-works.

On Tuesday, Aug. 12, the directors of the New Gas Company invited a large number of gentlemen to visit the works to see the whole process in operation, and to listen to a statement thereon by Mr. R. P. Spice, the general manager. A special train conveyed the party from London Bridge to Chichester, where they arrived shortly after five o'clock, proceeding direct to the gas-works, which adjoin the railway station. Here they were met by Lord Claud Hamilton, the chairman of the company, and other gentlemen interested in its management, and were at once addressed by Mr. Spice, who delivered the following explanatory lecture:—

Mr. Spice said: Gentlemen, you are well aware that the process patented by Mr. Ruck, and purchased, adopted, and introduced by the New Gas Company, consists in making illuminating gas from water. The water is converted into steam in an ordinary boiler, and is then passed through a super-heater, where it becomes highly heated and expanded. It is then conducted into a series of retorts—whether three, five, or seven is immaterial—in the presence, in our case, of coke and iron. If we were in Italy we should use lignite, the coke of the country, or in Ireland peat; but here we find the most convenient form of carbon is coke obtained in the ordinary way, as the result of distilling coal in the manufacture of coal gas. The coke is put into iron retorts—the proper charge for an ordinary 14-inch D retort 7 ft. 6 in. by 14 inches, being 1½ cwt.—the iron is chain, scrap, or anything you please. In these retorts the steam is decomposed, and is then passed on through the condenser and washer to the purifier or purifiers, containing oxide of iron, by which means the sulphur is taken out. From thence it passes through an apparatus called a saturator, which is charged with petroleum spirit of a certain specific gravity—*i.e.*, not exceeding 680—after which it passes on to the gasholder. That is a short account of the process. Now, we find that from every ton of coke in the retorts, by means of the steam, we obtain 132,000 cubic feet of gas. We use about twice that quantity of coke in the furnace to effect the operation, therefore it requires three tons of coke to produce 132,000 cubic feet of gas. This gas, we find, expands to the extent of 25 per cent. by passing through the petroleum spirit, so that in the end, by means of the coke, steam, and spirit, we get 165,000 cubic feet of lighting gas. The first gas, which, for want of a better name, we call the heating gas (and it has considerable heating power), is a compound of hydrogen, carbonic oxide, carbonic acid, and other gases. The quantity of petroleum spirit required to convert 1000 cubic feet of this heating gas into illuminating gas is, in round numbers, 1½ gallon.

With regard to the cost of the process, I will give it you in the form in which I have jotted it down, and as I am speaking to gas men, I would say you may make a note of these figures and work upon them. This is a summary of the process. For wear and tear, and labour, purifying material, and incidentals, 7½d. per 1000 cubic feet; spirit, 1s.; coke, 5d.; the total being 2s. 0½d. per 1000 cubic feet. But these figures apply to the 132,000 cubic feet, therefore you must deduct 20 per cent. so as to get the cost price of the 165,000 cubic feet which the gas becomes by passing through the spirit. The cost will then be actually 1s. 8d. per 1000 cubic feet for the finished gas ready to be sent out.

You will see the process by which this gas is manufactured at these works, and any of you will be at liberty to test it for himself. Mixed with coal gas in equal proportions you will find that its illuminating power is equal to 18·50 candles. It has been tested to-day by my friend Mr. Thorman, the manager, and he reports to me that 18·50 candles is its real illuminating power.

Now, gentlemen, the great value of this water-gas process in England, according to my judgment, consists in its power to supplement on very economical terms the manufacture of coal gas, and that is an object which we all, as gas men, must have at heart. I say as gas men, to say nothing of the public, for we cannot help benefiting them if we benefit ourselves; if we cheapen the production of an article we can sell it on better terms. I need not go into the particulars of the cost of coal gas of the illuminating power of 18·50 candles; speaking generally, I may put it down at 2s. 6d. per 1000 *at the least*, at the present price of coals. But, gentlemen, I have some figures here to illustrate the position I have taken up before the gas world. I have said it will be a great benefit if we can use a portion of this gas with a portion of coal gas; but if you aim to supply none other than this water gas pure and simple, you will have to go abroad and buy coke—you cannot do without it—therefore your policy will be to use a portion of gas made from coal so as to have a supply of coke for the manufacture of water gas. By this combination you will effect a greater economy of manufacture than by going, say from Chichester to Southampton, or Portsmouth, or Brighton, and buying coke to enable you to supply water gas alone in this locality.

That being the case, I will give you an illustration of what may be done under given circumstances. I will assume a gas company in the country using 10,000 tons of coal a year. Now, if instead of that they use 5000 tons for their coal gas, and make the other half of the gas required from coke and water and spirit, as they will make their water gas at much less cost than their coal gas, with coals above 18s. per ton, they will dispense with the use of 5000 tons of coals, and thereby save the excess cost, which I put down in round numbers at not less than 10s. per ton, which means a total saving of £2500. But that is not all they would save, because the 5000 tons of coal they would use would not require to be of the same quality as is ordinarily necessary. They may use any kind they like to produce coke. I do not care about quality. I have my quality in the other gas, and I can make it what I like. I have only to take out a little more carbonic acid, and I can raise the illuminating power at will. So long, then, as I can get a coal that will make coke, that is all I want. You know very well that a variety of inferior coals may be got at a cheaper rate than gas coal can be bought for, and you may in this way save to a moderate extent, say 5s. a ton. On these works I may state that I found, when I came here, two cargoes of coal which cost 30s. and a fraction per ton; since then I have bought coals at 21s. 6d., and I have a contract pending now for 100 tons as an experiment, which will only cost me 18s. upon the works—small coal is quite good enough for the manufacture of coke—and, therefore, I shall save with regard to the coal I use, not the moderate sum of 5s. per ton which I spoke of, but actually 12s. per ton, buying at 18s. instead of 30s.

Now, I say that £2500 may be saved in such a case, as I am supposing by dispensing altogether with 5000 tons of coal, and a further sum of £1250 by using an inferior kind of coal for the 5000 tons employed to make coal gas and supply coke for the water gas process. Therefore the net saving, looking at it simply in that way—and it is a way which I venture to think no one present will controvert—there would be a saving, in a gas-work which now consumes 10,000 tons of coal annually, of £3750 by the adoption of this process.

Now, gentlemen, I have another illustration which I take from a balance-sheet that came into my hands last Saturday morning. It relates to a gas company for which I am concerned, and where they used 6184 tons of coal last year. They had the benefit for more than half the year of an old contract. Their coals used to cost them from 14s. 6d. to 15s., but last year the average price was 20s. Now, having got rid of all contracts, they have bought coals at 26s. 6d. for 12 months. When their coal cost them 20s.—and with the advantage of coke being at a price which would be equivalent to the current cost of coal for half the year—they managed to drag through last year without any loss; but if they had had to pay the 6s. extra which they will have to pay this year, and had the benefit of the coke contract, they would have been £850 short of the sum required to pay their ordinary dividend. Suppose they applied the water gas process to those works, instead of being £850 short, they would be £1017 to the good by doing away with one-half of the 6000 tons of coal—*i. e.*, 3000 tons—and by the saving they would effect by using an inferior quality for the other 3000 tons.

I have been asked to give the details of the cost of 1s. 8d. per 1000 cubic feet for gas produced by this process, and I will just go over the figures again. Three tons of coke are required to produce 132,000 cubic feet of gas, which I put down at 20s. a ton. You may say that that is not correct now. True; I am giving you the old figures; but though my coke would cost more than 20s. at the present time, still there are other advantages which I have not entered into in making this account, and I therefore give you, upon my honour, as a fact, that my figures will work out practically to the same result, although my coke is put down at less than the market value. Three tons of coke, £3; 200 gallons of spirit required to saturate 132,000 cubic feet of gas, at 6d. per gallon, £6 13s. 4d.; wear and tear, at 4d. per 1000 cubic feet, £2 4s.; cost of purifying 132,000 cubic feet, at ½d., is 5s. 6d.; labour, 3d. per 1000, £1 13s.; incidentals, 1d.; total, £13 15s. 10d. If the spirit costs only 6d. per gallon, which is the fact here, it would be £1 13s. 4d. less, making the total £12 2s. 6d. That is the cost of 165,000 cubic feet of the finished gas. I take the larger sum of £13 15s. 10d., and, inasmuch as 165,000 cubic feet of gas, at 1s. 8d., comes to £13 15s., you see that my figures are pretty close. The summary of the figures is, as I gave it before: Wear and tear, and labour, and incidentals, 7½d.; spirit, 1s.; coke, 5d.; total, 2s. 0½d.; which, spread over the 165,000 feet, gives a net cost of 1s. 8d.

Now it has been said that if this process were extensively adopted the natural consequence would be that the value of the spirit would rise, and that may appear to be the judgment of common sense and experience. But there is no rule without an exception, and I have satisfied myself that there is an exception in this case. There is literally no limit to be assigned—humanly speaking—to the quantity of petroleum which exists in all parts of the world. It is not a question with us where we can find it—the question is where is it not to be found? France, Italy, Germany, Danubian Provinces, Turkey, Russia, Australia, Peru, California, United States, Rangoon, Japan—we can obtain it from all these places. The last-named country presents an extraordinary feature for one's mind to dwell on for a moment. It was only the other day that the commerce of Japan was monopolized by the Dutch, but now we are so far free from Dutch trammels—thanks to Lord Elgin—that the whole of that country is open to us. As a proof I have some petroleum in my office which was bottled in Japan, sealed and labelled there "Petroleum from Yokohama," and we can buy the petroleum, of which this is a sample, in any quantity we like. The New Gas Company have had a communication from the Japanese Government asking particulars as to the establishment of works there, and I have no doubt we shall set up gas-works there as well as many other places abroad.

I have hitherto confined my observations to England, but in every place where coal is dear—and in some parts of the world, as you know, it costs from £4 to £20 a ton—there this water gas will be made, and they will not want to come to London for spirit, as it can be found everywhere. So far from it becoming dearer, should this process come into general use, I believe we shall only have to ask in order to get any quantity of it we want. I see from the *Titusville Herald*, of July 29, under the head of "Sales of Crude Petroleum," that 13,000 barrels had been sold in one week—*i.e.*, from the wells of Pennsylvania—which, as to the sources of supply, is as but a drop in the ocean. We have been in the habit of looking at the supply as confined to that State, and we read of the shoddy aristocracy of America coming into immense fortunes from those oil wells; but it represents only a small fraction of the trade done in this article. We ourselves had a cargo of spirit from there which we thought well bought at 13 cents, f.o.b.; but it turned out anything but a good bargain, for we can buy it at this moment at 5 cents per gallon. I am not sure whether that is f.o.b. or at the wells. Speaking of the 13,000 barrels I just referred to, it was stated that the market being flat the price was only about 2d. per gallon—considerably less than 2½d. at all events, and the market declining. You therefore need be under no fear as gas men that in the present generation there will be any scarcity of petroleum, and as to the gas men of the future—well, we must leave them to take care of themselves.

Mr. Foxall, of Beverley: You have not included anything for the cost of the barrels.

Mr. Spice: You may dismiss from your minds any consideration of that sort. If they cannot be sent back, you can sell them advantageously. The ruling price of barrels in London, I believe, is not less than 3s. 6d. I bought some about five years ago, but I could get nothing under 3s. I will ask Mr. Goddard, who has had a great deal of experience in such matters.

Mr. Goddard, of Ipswich: We get them from the retailers, and pay from 2s. 6d. to 2s. 9d.

Mr. Spice: I know that, as a rule, in the London market these casks do command a good price. Now, gentlemen, having given these explanations, I shall be happy to answer any question respecting the process you desire to put to me.

Mr. Jabez Church: What did you give as the wear and tear of retorts?

Mr. Spice: Fourpence per 1000 feet.

Mr. Church: Does wear and tear include interest on capital?

Mr. Spice: No; that comes out of profit. I have been speaking of the cost into the gasholder.

The explanation being thus ended, the company proceeded round the works and examined for a short time the actual process of manufacture. An adjournment then took place to the Dolphin Hotel, where dinner was served to a company of about 150 guests, including several members of the Corporation of Chichester.

There being but little time to spare, the only toast given was "Success to the New Gas Company," which was proposed by Mr. E. Goddard, mayor of Ipswich and the engineer of the Ipswich Gas-Works. Mr. Goddard said he had been very much interested in the process he had seen carried on, and hailed with pleasure any improvement that could be made in the manufacture of gas, both as regards the public in general and gas companies in particular. He spoke as a "gas-man" to "gas-men," who had had this invention as ably brought before them by Mr. Spice at a recent meeting of gas engineers in Edinburgh. After watching the process that day, he could only say that they would be looking forward to the company's balance-sheet very anxiously, because that was the test-point for their judgment. There was no prejudice on the part of gas-men or gas companies, who would adopt any improvement in the manufacture of gas, and if it could be shown that by the adoption of this patent they could introduce their clients to a gas cheaper and better than that

made from coal, they would be only too happy to do so. He had great pleasure in proposing "Success to the New Gas Company."

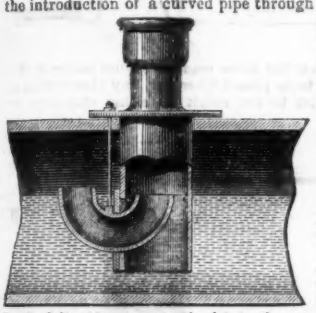
Lord C. HAMILTON acknowledged the toast, and explained that the proceedings must be short, as the return train would soon start, and it was desired that their guests should have an opportunity of inspecting the gas burning in the streets of the city. The company could only hope to command if they deserved success, and they had invited gentlemen to come there that they might investigate clearly and fully that which was offered to the public. They believed that they were offering to the public a manner of producing gas more economical and of better quality than had hitherto been available. They did not propose to set up rival companies, but they offered for the acceptance of existing companies that which they believed would be found a great improvement on the old mode of producing gas.

The company then broke up and proceeded to inspect the street-lamps, the special train returning at 9.30.

In a document freely circulated during the visit it was stated that the water gas had been subjected to the test of a reduction of temperature to the extent of 27° without in the least affecting its illuminating power, while air gas, subjected to a reduction of only 20°, has lost 33 per cent. of its power; and that it will travel any reasonable distance in pipes, and can be handled and delivered just in the same way and by the same means as coal gas, has been abundantly proved by actual and daily experience at Chichester, where it has been for many weeks continuously used throughout the city and environs, sometimes by itself, and at other times mixed with coal gas, in proportions varying from one-third to two-thirds, just as convenience might dictate.

HAWKINS'S IMPROVED PATENT DIP-PIPE.

The object of this invention is to relieve the retort from pressure while gas is being evolved from the coal, and this is effected in the following manner:—The dip-pipe inserted in the hydraulic is made sufficiently large to admit of the introduction of a curved pipe through its side, the opening being closed by a plate, which is attached to the curved pipe. One end of a rod is fastened to the curved pipe, and the other passes through the top of the hydraulic, where it terminates in a screw and nut; this serves to support the curved pipe, and admit of its height being accurately adjusted. The legs of the pipe are slightly unequal in length, the shortest being placed within the dip. The short leg of the curved pipe is slightly below the water-line mark, therefore the liquid runs into and fills it up. When the retort is charged, the gas coming off would pass down the dip-pipe and escape in the usual way; but, inasmuch as the gas has a less head of liquid to contend with in the curved pipe, it forces the liquid therefrom into the hydraulic, and continues to pass in that direction so long as gas is given off from the retort; when it ceases the water in the dip-pipe flows into the curved pipe, and thus restores its original seal. [Messrs. Newton, Chambers, and Co., of Thorncliffe Iron-Works, are the manufacturers.



THE PROTECTION OF LONDON FROM FIRE.

Mr. Thos. Page, C.E., writing to *The Times* on this subject, remarks:

"With regard to fires in general, let me observe that the metropolis is amply supplied both with water and engine power from the reservoirs and by the engines of eight water companies, whose names and engine power are as follow:—The New River Company, 1800-horse; the East London Water-Works Company, 1250; the West Middlesex Water-Works Company, 1200; the Grand Junction Water-Works Company, 1800; the Chelsea Water-Works Company, 1025; the Southwark and Vauxhall Water-Works; 1990; the Lambeth Water-Works Company, 1300; and the Kent Water-Works Company, 1183; thus commanding an aggregate of 11,548-horse power.

"But to render this great engine power available at all hours for the extinction of fires, the intention of the Legislature for securing the constant supply system should be carried into effect, and it is almost incredible that any opposition should have hitherto prevailed to prevent the accomplishment of so great a measure. Yet when it is known that even the Metropolitan Board appeared in opposition to the "Metropolis Water Bill" before the committee of the House of Commons, presided over by the Speaker of the House, the delay may not appear so surprising. The paragraph in the report of that committee, dated July 25, 1871, contains this remarkable sentence:—

"The bill referred to your committee has encountered opposition from two quarters the Metropolitan Board of Works have appeared before them as opponents on the ground that the bill does not go far enough in recognising municipal authority, while the eight water companies have opposed it on several grounds, and mainly because it invests the Metropolitan Board of Works with powers to which they object.

"If, however, any unbiassed person will carefully read the evidence of the engineers of the several water companies, he will fail to discover any serious opposition to the bill. All of them unite (Mr. Greaves less strongly than others) in the opinion that the constant supply system is not only practicable but desirable, and the importance of the system is well asserted by Mr. Rawlinson, Mr. Pole, and Mr. Bateman, all of whom are acknowledged authorities on hydraulics.

"Mr. Quick, whose position and long experience entitle his observations to serious notice, remarks that there has been no application for a constant supply by any local authorities, and with regard to any defect in the supply for fire caused by the absence of the turncock, the Fire Brigade allows no one to call the turncock, the police appoints no one to call him, and the consequence is it is left to chance. He gave evidence before the committee of the House of Commons, 1862, on fires in the metropolis; proposed to place a man at the 'disposal of each station of the Fire Brigade, and to pay him if they would allow him to lodge there, so that when a call is made the man should go at once to the turncock; all this to be done at the expense of the water companies.' What was the answer to this judicious proposal? The answer was—be it well remembered—'They could not entertain such a proposition.'

"Mr. John Taylor, engineer of the Lambeth Water-Works Company, gives valuable detailed evidence on the quantity of water pumped, the cost of hydrants for fire under the constant supply system; and Mr. Bateman, observing on the very imperfect arrangements in London for the supply of water at fires, states that since the constant supply system has been established at Manchester, the loss by fire has been reduced from 21 per cent. to less than 7 per cent.; that the fire-engines have been discontinued, but are used as omnibuses to carry the men.

"The system I would suggest for the metropolis is, that until the constant supply is introduced, the chief officer of the Fire Brigade should telegraph to the engine station of the water company in whose district the fire occurs, to work the engines at full pressure, or according to the pressure required for extinguishing the fire Hydrants being fitted to all the pipes and the furnace fires of the boilers in readiness, then, instead of the buildings attacked by fire and their contents being destroyed, the engines of the water-works would throw such a body of water upon the fire, the hose guided by the Fire Brigade, that the danger would be greater of being drowned than being burnt."

METROPOLIS GAS SUPPLY.

Dr. Stevenson's report on the quality of the gas supplied in t. Pancras during July states that the average illuminating power of the gas supplied by the Imperial Company was 14·3 candles—the maximum 15·5, and the minimum 13·4 candles, tested according to the requirements of the Metropolis Gas Act, 1860. The sulphur present amounted to 11·71 grains per 100 cubic feet. Of other impurities, ammonia was always present, though never in large quantities, whilst sulphuretted hydrogen was never detected.

METROPOLIS WATER SUPPLY.

Major Bolton's report on the water supplied to the metropolis in July states that during the whole of the month the state of the river at Hampton, Molesey, and Sunbury, where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated, was good from the 1st to the 13th of July, when it became turbid and slightly coloured. It remained more or less in this condition until the 24th inst., when it improved, and was clear and bright for the remainder of the month. The highest flood state of the river at Hampton during the month was 8 inches above the (6 feet) summer level, and the lowest 1 inch below.

At Ditton (where the Chelsea Company now alone draws its supply) the state of the water in the river was good for 20 days, and indifferent for 11 days during the month. The highest state of the flood water at this place was 7 inches, and the lowest was at summer level. The highest temperature of the water during the month was 73°, and the lowest 64°, while the highest temperature of the air at the same place was 87°, and the lowest 56°. These observations were made daily at 9 a.m. The rainfall during the month was 2·17 inches.

The construction of additional subsiding and impounding reservoirs by the Chelsea, Grand Junction, and Southwark and Vauxhall Companies is most desirable.

The Kent Company are giving constant suppply of water to about 1000 houses in their district, situated in the parishes of St. Mary's, Rotherhithe, and St. Paul's and St. Nicholas, Deptford.

The New River Company have now the power of affording effective constant service in their district. They have also commenced a new high service covered reservoir to contain 1,000,000 gallons at Southgate, in anticipation of the requirements of the water supply to Edmonton parish. The company have in a number of cases afforded constant supply by means of stand-pipes, and have recently agreed with a committee of the Corporation of the City of London to furnish constant supply at once to a large number of the houses of the poor within the City bounds, and are only waiting the arrangements of the officers of the corporation in connexion therewith.

The East London Company, in accordance with their notice previously given to a special district of 6328 houses, turned on the constant supply on March 25. The district was altogether unprepared for the constant supply, and the company has had to overcome the tardiness of the small landlords by cutting off the water supply of nearly 500 houses in this block, and the owners of such houses have thereby been compelled to amend the fittings. The district is under rapid improvement, and the tenants are gradually deriving the benefit of the constant supply.

The Southwark and Vauxhall Company are constructing covered service reservoirs at Nunhead, to contain 18 million gallons, and are erecting additional engine power for high pressure constant supply. Additional boilers and works are also being constructed at Hampton.

The West Middlesex Company are giving constant supply to a number of houses on the application of the owners, who have provided fittings according to the Board of Trade regulations of the 10th of August, 1872, and are fully prepared to extend the constant supply when called upon. This company is also constructing additional engine power at Hammersmith and at Hampton to ensure effective constant supply.

The Grand Junction Company have completed a high service reservoir near Kilburn, to contain 6 million gallons for constant supply, and are now laying a line of main pipes to connect up this reservoir with the works at Campden Hill, and are likewise erecting additional boilers and works at Hampton.

The Lambeth Company are carrying out extensions and improvements in their works. At Molesey, the construction of reservoirs is being proceeded with to contain 110 million or 120 million gallons of water, with pumping-engines to fill them to a level of 12 feet above the river. When full these reservoirs will contain 10 or 12 days winter supply to the district, and during the months when floods prevail (by selecting the times of pumping when the river water is in the best condition) a good deal of flood water will be allowed to pass. Several days subsidence will thus be provided, and consequently an improvement in the water should take place. The water from the reservoirs will run by gravitation through the new conduit to the filters at Ditton, which are in course of extension by the conversion of the two reservoirs there into filter-beds, which, when finished, will increase the present filtering surface by 70 per cent. The company are giving constant supply by means of stand-pipes in a number of courts and alleys, and arrangements have been made to supply upwards of 5000 houses of this class. The alterations in fittings under the new Board of Trade rules and regulations are being gradually effected as occasion offers, and are carried out in all new buildings. The Act of 1871 provides power to compel the companies to give constant supply as and when the public authorities may see fit to move.

LOUTH PUBLIC LIGHTING.—At a meeting of the Louth Local Act Committee, held on the 19th inst., tenders were received for cleaning, lighting, and extinguishing the public gas lamps for the season, commencing on the 23rd. That of the old contractors (Graves and Co.) was accepted at 9s. each per man per week, being an advance of 1s. each upon the previous year.

PAISLEY GAS COMMISSION.—A meeting of the commissioners was held on the 20th inst.—Provost Murray in the chair—when it was unanimously resolved to make application to the Board of Trade for a Provisional Order empowering the commissioners to increase the maximum rate for the supply of gas to 6s. per 1000 cubic feet, instead of 4s. 2d. as at present fixed by Act of Parliament. At a recent meeting it was resolved to raise the price of gas to the maximum sum, but as the cost of its manufacture, by the increased value of coal and wages, amounted to 1s. 9d. over that figure, the present application has been considered imperative.

WAKEFIELD GAS COMPANY.—The half-yearly meeting of shareholders was held on the 11th inst.—Dr. Statter in the chair—when dividends at the rate of £10 and £7 10s. per cent. were declared upon the old and new shares. The accounts showed a total income of £11,289 3s. 9d.; the half year's profits being £4167 6s. The capital account showed a total of £78,686 14s. 3d. The secretary's salary was increased from £170 to £200. A proposition to reduce the salary of the chairman and engineer (Dr. Statter) from £120 to £75 was negatived. The retiring directors were reappointed.

HINCKLEY NEW GAS-WORKS.—On Friday, Aug. 8, the new works in this town, which have been erected under the direction of Mr. Surl, the company's manager, were opened, and the event was celebrated by a supper, at which about 60 persons were present, and which was served in the retort-house. Mr. Farmer presided, and, after the usual loyal toasts, "Success to the Hinckley Gaslight and Coke Company," and the healths of the manager, the contractor for the works, the secretary (Mr. Pridmore), the chairman, &c., were drunk with much cordiality.

HOME-MADE GAS.

The accompanying woodcuts illustrate some apparatus invented by Messrs. G. B. Fearnley and Son, West Brompton, and shown at the International Exhibition, by the aid of which every householder may make his own gas. These inventions need not alarm any gas company, for we take it that no one will be at the trouble to manufacture gas for himself if he can command a supply, not even if the economic advantage of the practice were as great as Messrs. Fearnley declare. But in remote country houses, and in some places abroad where coal is accessible, they offer to a householder who chooses to take a little trouble the means of providing himself with the convenience and comfort of a gas supply.

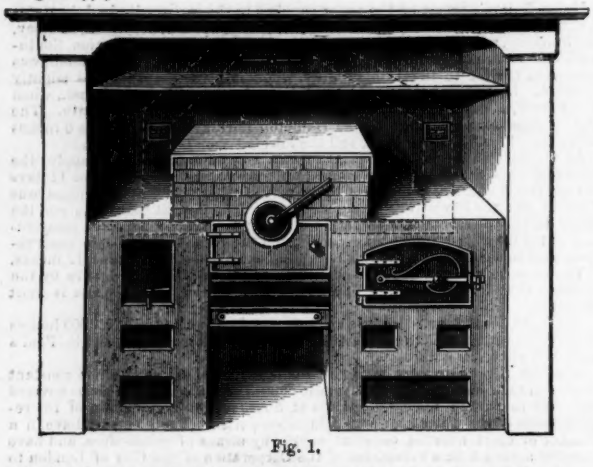


Fig. 1.

Fig. 1 shows a gas-retort fixed in an iron chamber above the open fire of an ordinary kitchen range, which is fed with the residual coke. From the retort the gas passes to the condenser and purifier shown in elevation and section in figs. 2 and 3. The condenser is a simple worm in a water-box, with a chamber below to hold the tar. From the condenser it passes to a washing-tank, thence through the purifier, in which lime is disposed on a number of trays, as in ordinary practice, and so on to the holder placed outside the house. It is clear that in this arrangement the distillation of coal takes place at a comparatively low temperature, and that but a small yield of gas will be obtained. It is no less clear, however, that the gas produced will be of high illuminating power. There are no means of testing the illuminating power at the Exhibition, but we believe the inventors of the apparatus when they state that it is equal to 18 or 20 candles. The purification is tolerably complete. We tested the gas on two occasions for sulphuretted hydrogen and ammonia, and found neither; and it is probable that but little sulphur is present in the form of bisulphide of carbon. The worst that can be said of the gas is that it has a very bad odour, obviously in consequence of imperfect condensation, and the retention of the vapours of some of the more fœtid hydrocarbons. This may, however, be considered a recommendation, as it would call early attention to any leak in the distributing apparatus.

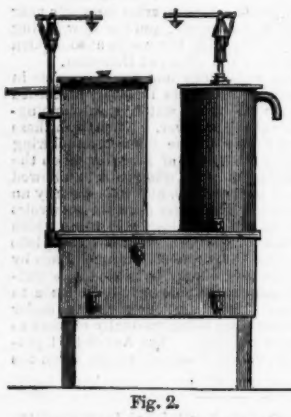


Fig. 2.

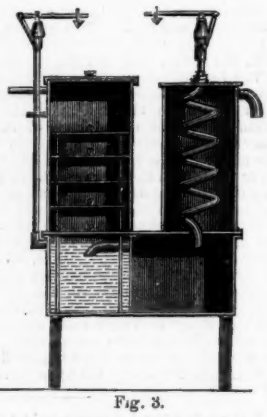


Fig. 3.

According to Messrs. Fearnley, gas made in this apparatus costs but 3d. per 1000 feet. We do not exactly see how this figure is arrived at, but do not dispute its accuracy. It is open to doubt in these days whether any cook or even kitchenmaid would engage in the additional duty of gas stoking, and if it were found necessary to employ additional labour in a kitchen in which this apparatus is placed, the cost of the gas would be greatly increased. The purifying part of the apparatus is obviously beyond a woman's management, and thus another element of cost is introduced. Another thing also strikes us, which is that the apparatus would render any ordinary sized kitchen intolerably hot even in winter.

In figs. 4, 5, 6, 7, and 8, we have illustrations of a separate, or as the inventors call it, a "portable" apparatus for the manufacture of gas. Fig. 4 shows an elevation of the retort and furnace, of which a cross section is seen in fig. 6, and a longitudinal section in fig. 6. The condensing and purifying arrangements (figs. 7 and 8) are the same as those provided for the kitchen range. This apparatus is intended for the supply of gas to churches, chapels, outhouses, conservatories, &c., but, of course, could be used for a house. The cost of 18-candle gas made by this arrangement is said to be 2s. 2d. per 1000, a large increase on the cost in the previous case, but still probably much too low. With the kitchen-range apparatus the inventors evidently assume that the coal is distilled for nothing, the heat by which it is effected being considered waste. This would not be exactly true, even if the whole cooking power of the range were employed all the time gas was being made, which would never be the case. As it is, a large proportion of the fuel must be considered as used to distil the coal, and should be allowed for in estimating the cost of the gas. In the separate apparatus the whole ton of coal is supposed to be used up in producing 9000 feet of gas, and if it be so, at the present price of coal to a small consumer, the cost of the gas would be a good deal more than 2s. 2d. per 1000, without taking labour into the calculation. The matter of cost is, however, of small consideration when these apparatuses are in question. We have said that no householder will manufacture his own gas if he can purchase a supply. But there are thousands of houses in the kingdom in which small gas plants might be used with much comfort, and in the end with some economy. A friend of ours lighted his small country house very successfully by means of a little apparatus attended to by the stable boy. The gas was not very pure nor very cheap, but he obtained a good light with much less trouble than by moderator lamps, and it was a great deal cheaper than candles.

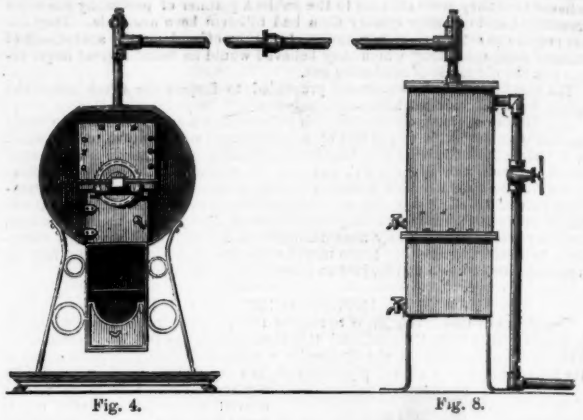


Fig. 4. Fig. 8.

It is right to add that every provision has been made to ensure safety in the use of the apparatus. Valves have been placed wherever any obstruction is likely to arise, and an accident must be the result of either stupidity or negligence.

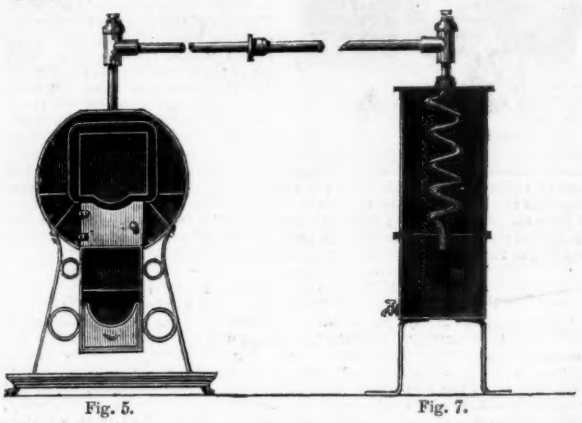


Fig. 5. Fig. 7.

A novel feature in the kitchen apparatus is, that by a small additional outlay it may be arranged to distribute a current of heated air to any particular room or all over a house, while the separate apparatus may be employed to heat conservatories and greenhouses more cheaply and with much better effect than the hot-water pipes commonly used.

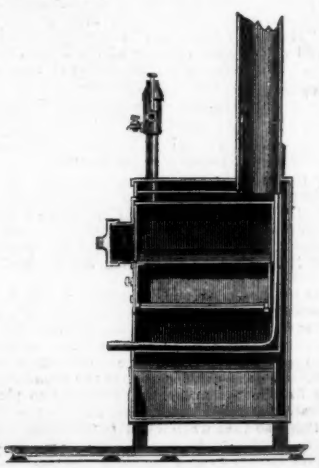


Fig. 6.

In combination with the apparatus is shown a lock regulator. By the use of it a consumer has just as much control over the consumption of gas as over the consumption of wine in his house. If he leaves his house for a time he can provide against a general illumination at his expense during his absence by locking the regulator, so that only the quantity of gas to supply the exact number of lights he deems necessary will be allowed to pass. This instrument may be strongly recommended to economical consumers.

MARGATE PUBLIC LIGHTING.—At the meeting of the Town Council on the 12th inst., the Watch Committee presented a report in which they recommended the council to adopt average meter indication for the supply of gas, and were of opinion that a great reduction might be made in the consumption of gas by adopting this course, and reducing the number of hours of lighting public lamps. The report was passed, and a committee appointed to carry out the necessary arrangements.

GAS COMPANIES DIVIDENDS.—At the meeting of the Kendal Gas Company, on the 12th inst., a dividend at the rate of 10 per cent. was declared.—The Kidsgrove Company, at their meeting on the 14th, declared a similar dividend; as did also the Airedale Company, on the 11th. The Ashford (Kent) Company, at their meeting on the 18th, paid 6 per cent.; and the Faversham Company, at their meeting on the 13th, paid 10 per cent. The directors of the latter company reported that they had (in consequence of the increase of the price per lamp for lighting the public lamps) determined, as promised, to lower the price of gas to private consumers to 5s. 3d. per 1000 feet, from the 1st of July, further reducible to 5s., if paid within a month.

BRIGHTON GAS SUPPLY.—The corporation gas analyst, in his usual monthly report to the Gas Committee, remarks:—"The gas from both companies has been sustained, by the average of observations, above the standard. Impurities are small. In compliance with parliamentary power acquired by the Hove Gas Company, the gas supplied by that company will in future be tested with the burner known as 'Sugg's London Argand,' the practical effect of such alteration in the test burner will be to show a greater value of illuminating power to the gas when compared with the old test burner, it will thus enable the company to supply gas of lower quality. In justice to the gas companies, it may be stated, that Brighton is one of two places only in England in which the inferior test burners have been used so recently."

ADVANCES IN THE PRICE OF GAS.—The Corporation of Leeds have resolved to add 3d. per 1000 to the price of gas from Oct. 1, and the question of discontinuing discounts to large consumers has been referred to a committee to consider and report upon. A similar advance has been determined upon at Liverpool. At Woodstock the price has been raised from 6s. 8d. to 7s. 6d.; and at Wainfleet there has been an addition of 10d. In Scotland advances have been made at Leslie from 7s. 6d., to which it was recently raised, to 8s. 4d. Forfar (Corporation Works), from 5s. to 7s. 1d., and at Cambeltown from 7s. 6d. to 9s. 2d. The Paisley Commissioners are the first to take advantage of the Gas and Water Facilities Act, 1873, and have resolved to apply to the Board of Trade for a Provisional Order to increase their maximum price from 4s. 2d. to 6s.

HUNTINGDON AND GODMANCHESTER GAS COMPANY.—The annual meeting was held on the 6th inst.—the Earl of Sandwich in the chair. The directors reported that the business of the company was satisfactory. The great advance in the price of coal continued, and there was much reason to apprehend that an additional advance upon coal used for making gas and other manufacturing purposes would be made during the coming year; indeed, the company were so impressed that such would be the case, that they had already entered into a contract at an advanced price. Under these circumstances, they could not hold out any early prospect of a reduction in the present price of gas and coke. The balance-sheet showed a sum of £1401 15s. 9½d. available for dividend and reserve; and the directors recommended that a dividend of 8 per cent. for the past year be declared, free of income-tax, and that £200 be added to the reserve. On the motion for the adoption of the report, an amendment was proposed and carried that the dividend be at the rate of 8½ per cent.

BOSTON PUBLIC LIGHTING.—The local board of this town held a meeting on the 18th inst., when the mayor, referring to the gas contract, said that when the board met last week he read the draft copy agreed to by the board and the gas company for the future lighting of the public lamps. Since then the clerk to the company had introduced an additional clause, which he would read to them. It was to the effect that in the event of any member of the local board subjecting the meter system to unfair treatment, or in any way tampering therewith, the company, on giving three days notice, should be able to annul the contract and turn off the gas. It was clear, he said, that the board could never adopt a clause of this nature, and to meet the case he had sketched one which he thought would answer all the purposes of the gas directors and protect the board. It proposed to refer all disputes that might arise from either side to arbitration, and where the offence complained of was proved to the satisfaction of the arbitrators a three days notice should be sufficient from either party to render the contract null and void. After some discussion, the clause proposed by the mayor, with the omission of the words "three days notice," and the addition of the words "the arbitrators to have power to assess such damages as they think proper in all cases of dispute," was agreed to.

SEAHAM GAS-WORKS.—These works, which were commenced by, and have hitherto been the property of Mr. Henry Wall Smith, are about to change hands. Mr. Smith has carried them on successfully for the long period of 30 years. On his intention to dispose of the works being made known to Mr. Eminson, Lord Londonderry's agent, that gentleman, feeling most anxious that the proprietorship should not go out of the town, bought the works, and has since the purchase offered them to the Local Board of Health, stating that he considered the board the most suitable party to have the control both of the gas and water supply of the town, had the latter not been already sold to the Sunderland Company. A meeting of the local board was held on the 21st ult. to consider Mr. Eminson's proposal, which was, after discussion, rejected. The following is a copy of the resolution come to at the meeting:—"That the board express their thanks to Mr. Eminson for his offer to sell them the Seaham Harbour Gas-Works, but feel that they are not in a position to accept it, and would prefer the gas supply of the town remaining as hitherto in private hands to their becoming gas-works proprietors."

FORFAR (CORPORATION) GAS SUPPLY.—The annual financial statement of the Forfar Gas Corporation has just been prepared and approved of. From the capital account it appears that during the year ended the 15th of June, there has been expended on improvements £227 14s. 4½d., and on extension of works £2096 16s. 6½d.; also that since the transfer of the works £177 3s. 9d. has been expended in redeeming annuities. Under ordinary revenue and expenditure it is stated that for gas supplied to consumers, £3631 8s. 7½d. has been received: for meter-rents, £211 1s.; and for residual products, £214 16s. 2d. The total revenue has been £5478 5s. 0½d., and the expenditure £4865 7s. 6d. The general balance-sheet shows the following:—

Cr.				*Dr.*		
Balance brought from capital account	£853	11	9	Balance on revenue account	£572	14	4
Value of stores on hand to credit of revenue	891	2	0	Bank account due	626	10	3
Book debts for residual products due to corporation	57	10	1½	Book debts for coals and bricks	735	0	5
Arrears of gas and meter rents	403	10	10	Deposit on hand in security of gas-rates	2	5	0
				Balance due to Treasurer	19	4	8½
	£2005	14	8½		£2005	14	8½

It has been resolved to raise the price of gas from 5s. to 7s. 1d. per 1000 feet.

LEEDS (CORPORATION) GAS SUPPLY.—At the meeting of the Leeds Town Council, on Wednesday, Aug. 13—the mayor (Alderman Oxley) presiding—it was moved by Mr. Wray, the chairman of the Gas Committee, seconded by Alderman Lucocck, and resolved—"That the price of gas be increased 3d. per 1000 cubic feet, such increase to take effect from Oct. 1 next." A discussion took place upon a motion by Mr. Scarr, to the effect that as gas was at present being sold below cost price, discounts to large consumers should hereafter be discontinued. It was urged by Alderman Addyman that it would be injudicious at the same time to increase the price of gas and to abolish discounts. The accounts of large consumers sometimes amounted to as much as a whole street of small consumers, with less proportionate cost for providing the supply, so that it would be rather unfair to put all classes on an equal footing. If they were not fairly considered large consumers might make their own gas. Mr. Mason thought that if large consumers could manufacture their own gas cheaper, and chose to do so, it would save the corporation such outlays as that of between £20,000 and £30,000 at present for an enormous new gasholder. Alderman Tatham said that when this subject was recently before the committee the most they could recommend was a reduction of the discounts, and he did not suppose they would feel justified in doing more now. The allowance of discounts to large consumers was a sound principle of trade. Mr. Harland said the principle might be sound in a profitable trade, but it was quite fallacious in a business conducted at a loss. Alderman Barran said gas manufacture was at present in an exceptional condition. If a resolution were now passed discontinuing discounts, probably the effect would be a combination among a number of the large consumers to supply their own wants. Their custom might thus be lost, and then there would only be left the small consumers in tenements and streets, whose supply was far more expensive. Independent of its distribution, the gas as manufactured did not cost nearly 3s. 9d. per 1000 feet. The difference was to meet the expense of delivery, leakage, collection of accounts, &c., which items were all greater in the case of small consumers. Mr. Wray (chairman of the Gas Committee) said that in 1872 there was a profit upon the gas of £12,500. This year, however, they had to contract for 100,000 tons of coal at an increased cost of no less than 9l per cent., which alone made a difference of about £48,000. They would make something like £15,000 more money this year from coke at the increased rate of 10s. per ton for 30,000 tons; but, as nearly as could now be ascertained by the committee, there would still be a deficiency of about £10,000 on the gas after the 3d. now proposed was added to the price. Seventeen members voted for Mr. Scarr's proposal, but the majority were against it, and the motion was therefore lost. It was, however, unanimously resolved that the question of gas discounts be referred to the committee for consideration and report.

STRIKE OF GAS STOKERS AT HUDDERSFIELD.—It is reported that ten gas stokers employed by the corporation left work on Friday last, because their demand for an increase of 3s. per week had been refused. Several others have given notice to leave in a fortnight unless the advance is conceded.

AMERICAN COAL SUPPLIES.—The *New York Coal and Iron Record* says the Kanawha coal-fields embrace about 8000 squire miles, and present, in aggregate strata, above the water level, over 70 feet of coal. Professor Rogers pronounced this the most remarkable deposit in the United States, and Professor Ansted, the distinguished geologist, who visited the Kanawha, estimates the deposits at 55,000 tons per acre. Three varieties of coal occur—cannel, splint, and bituminous. The cannel is equal to the best foreign production. It is said that cannel coal can be mined in West Virginia, and sold in New York at a profit, at 11 dols. per ton, against 22 dols. for English cannel. It is said to be fully as good as the English.

PETROLEUM IN CALIFORNIA.—Rumors have been current for some time past of discoveries of petroleum on the Pacific slope. Their truth is at length confirmed by the *Los Angeles Express*, which gives the following particulars of the region in which the petroleum has been found. It says: "The oil range is 35 miles north-west from the city of Los Angeles, on the road to Fort Tejon, and 13 miles from the Mission of San Fernando. Three tunnels have been cut from 70 to 100 feet in depth, and from these and the two wells the flow of oil is continuous. The petroleum is led through iron pipes to large tanks, and is dipped with buckets from springs. The cost of transportation to Los Angeles is about two cents. per gallon. We have seen the report of Louis Falke, now State assayer, who estimates the value of the crude petroleum submitted to him for analysis to be much greater than that of Pennsylvania or elsewhere in the United States."—*Coal and Iron Record.*

SMOKE CONSUMPTION AT CINCINNATI.—The committee of the Council of Cincinnati on the Prevention and Consumption of Smoke, after duly considering all the facts bearing upon the subject that they have been able to gather, have determined to draw up an ordinance, modelled after the English statute as far as practicable, enjoying the attachment of a smoke consumer to every furnace used for manufacturing purposes in the city, six months after the passage of the ordinance, providing for the punishment by fine, on the English plan, of those who fail to comply, and also providing for the appointment of a Smoke Commissioner. The committee say the first object will be to extract the mote from the municipal eye, by putting up consumers in the water-works and other public institutions, and the next to apply the remedy to the manufacturing establishments. It is estimated by scientific men with whom the committee have been in conference, that the damage done by smoke in Cincinnati is 3½ million dollars a year—1½ million over the entire city's annual coal bill.—*Coal and Iron Record.*

NEWFOUNDLAND WATER SUPPLY.—Mr. William Morris, of the firm of Kinipple and Morris, of Westminster and Greenock, has recently returned from Canada and Newfoundland, having been called upon to report on the deficiency of water to St. John's, and to devise means of providing for a more efficient supply of water thereto.

HULL WATER SUPPLY.—At the meeting of the Hull Water-Works Committee, on the 11th inst., Mr. Woodhouse called attention to the desirability of some temporary appointment being made with a view to stop the great waste of water which undoubtedly went on in the borough. The engineer, in one of his reports, had stated his opinion to be that the waste from leakage and other causes amounted to above half the total quantity pumped into the town. Steps had been taken to prevent the waste by taking up old pipes and replacing them by new ones, but he thought a man might be temporarily appointed to call at houses and examine taps. He moved a resolution to the effect that the engineer select a person, subject to the approval of the committee, to act temporarily in the inspection of water-taps and fittings, and to perform other duties under the direction of the engineer, for the prevention of a waste of water, at a salary not exceeding £2 per week. Mr. Easterby seconded the motion, which was carried.

Register of New Patents.

3093.—WALKER, R., Victoria Street, Westminster, "*A new mode or method of applying atmospheric gas, spirituous vapour or gas, and impregnated combustible vapour or gas as a heating medium for the generation of steam or other purposes.*" Patent dated Oct. 19, 1872.

The method of manufacturing the air vapour or gas is by means of pumps or other appliances, by which the air or atmosphere is forced through a perforated or inlet pipe placed in a vessel called a receiver, which may be of any convenient shape; this vessel is partially filled with naphtha, petroleum, methylated spirit, benzine, or other suitable spirit, oil, or hydrocarbon, or a combination of them. These, whether employed separately or combined, are termed "impregnating liquid." When requisite or desirable the "impregnating liquid" is to be heated for increasing the strength and volume of the vapour or gas. In the receiver is placed a plate or plates in a certain position relative to the perforated or inlet pipe, and to the level of the liquid. The air or atmosphere after impregnation passes from the receiver into one or more expanding and contracting vessels or regulators, which are made of vulcanized india-rubber, or of any other substance made to expand by force and to contract by weight. By the contraction of these regulators the air is forced into the pipes, and thence regularly through the burners for ignition.

The burners convenient to the purposes of the invention are iron tubes perforated with holes in a line or lines along their length, and disposed under the generator or vessel to be heated, in straight or curved lines, or as ring burners, according to circumstances, fittings or arrangements being sometimes made for readily renewing and replacing them, and if desired substituting others when cleaning may be necessary.

3254.—WEEMS, J., Johnstone, N.B., "*Improvements in gas-meters, part of which is also applicable to gas-generators.*" Provisional protection only obtained. Dated Nov. 2, 1872.

These improvements consist in the application of a fountain chamber to maintain a constant water level and so correct fluctuations of registered measurement. In generators for the production of gas from liquids the fountain chamber is applied, which maintains a constant liquid level as the liquid evaporates.

3261.—WANKLYN, J. A., Hampstead Road, Middlesex, "*Improvements in the production of oxygen gas.*" Patent dated Nov. 2, 1872.

This invention consists in utilizing the chemical properties of copper and oxide of copper in the preparation of oxygen gas. It is known to chemists that metallic copper has the property of absorbing oxygen from the air with great readiness and completeness at a low red heat, and that oxide of copper (which is produced by this absorption) parts very readily with its oxygen to organic substances. The inventor has recently observed that oxide of copper also parts with oxygen very readily to certain metallic oxides. These properties render copper and oxide of copper serviceable in the extraction of oxygen from the atmosphere. It is known that when baryta is heated to low redness in air it takes up oxygen, and that when the resulting peroxide of barium is heated in steam it parts with the oxygen which had been taken up, and that by taking advantage of these properties oxygen may be extracted from the atmosphere and rendered available for use. There is, however, as is well known, a practical difficulty on account of the slowness of the absorption of oxygen by the baryta.

This invention has for its object the getting over this difficulty by the use of copper and oxide of copper, thereby rendering the extraction of oxygen from the atmosphere a cheap and practicable operation.

The following is an example:—One part by weight of baryta is mixed with one part by weight of lime and about one part by weight of oxide of copper. The mixture is then placed on the bottom of an iron retort and heated to redness, after which steam is passed through the retort and led into a vessel containing cold water to condense it. The oxygen which accompanies the steam is led into a gasholder. After passing steam through the retort, air is passed through it, and the nitrogen which is not absorbed is allowed to escape. The treatment is then repeated with steam.

3269.—GOLDSMITH, G., and DILKES, J., Leicester, "*Improvements in the means of and apparatus for removing obstructions from gas-pipes.*" Patent dated Nov. 4, 1872.

The object of this invention is to afford means for clearing gas-pipes, especially services, and consists in forming a plug furnished with a barrel which is to be filled with gunpowder and inserted in the offending pipe. The charge is then to be fired by striking a percussion cap placed on a nipple on the outside of the plug, when an explosion ensues and the removal of any obstruction is the result.

3271.—BENNETT, W., Liverpool, "*An improved automatic apparatus for the differential adjustment, reduction, and regulation of pressures, either of fluids, steam, or gases.*" Patent dated Nov. 4, 1872.

The features of novelty which constitute this invention consist of constructing a tank or suitable closed vessel and fitting it with apparatus that will differentially adjust, reduce, and regulate excessive pressures of fluids, steam, or gases. An apparatus is fitted inside the vessel on to the supply-pipe, and may consist of a lever which works a suitable cock or valve. The lever carries a float which actuates the lever by its differential specific gravity. The float is partially opened at its lower end, so that the fluid finds its way into the float according to the density of the air (inside the float), which by its compressibility allows the fluid to partly enter the float, thereby causing the float to sink and shut the supply cock. As the pressure equalizes, the air in the float by its elasticity expels the water from the float, thereby reducing the specific gravity. The pressure is thus regulated. The same result may be obtained by using plungers, springs, or other known mechanical means, by using the excessive pressure over that required as the means of actuating such apparatus.

3273.—SPENCE, J. B., Manchester, "*Improvements in obtaining anthracene, and in apparatus connected therewith.*" A communication. Provisional protection only obtained. Dated Nov. 4, 1872.

This invention consists of a pitch tank, tempering reservoir, still, and condenser for the purpose of obtaining anthracene from coal-tar pitch, whereby the same is continuously produced. To accomplish this object the pitch, deprived of all or nearly all its light oils and naphthaline, is placed in a tank, and is forced from thence by air pressure into a reservoir, and there heated by a furnace to enable it to flow by its gravity through a pipe into a still, the air pressure regulating the quantity. The still consists of a vessel with several transverse partitions, forming channels communicating with each other at alternate ends, and through which the pitch flows to and fro, to establish which communications there may be steut cross-pipes, proposed to be bent downward. The still is submitted to heat from the furnace, and the evolved vapour containing anthracene passes from the top to a tank surrounded by water, where it is condensed, and afterwards drawn off, filtered, and pressed.

3275.—KING, G., Beckton, North Woolwich, "*Improvements in apparatus used in the manufacture of gas.*" Patent dated Nov. 5, 1872.

The object of this invention is to secure the lids of retorts and effect a gas-tight joint without the application of luting, and consists in making the lid of cast-iron and inserting in a groove near its circumference a ring of steel of retangular section, a portion of the ring being allowed to project and bear against the face of the mouthpiece. The lid has an inclined plane cast upon it, and is attached to a cross-bar, which is hinged to the mouthpiece on one side, and falls into a catch on the other. A lever is pivoted to the cross-bar in such a manner that on being pulled it forces a wedge between the inclined plane and the cross-bar, and so maintains the lid in close contact with the mouthpiece until the lever is moved in the opposite direction.

3280.—ROBERTS, M. J., Bath, "*Improvements in, or a new or improved material for, packing stuffing-boxes and pistons, and making pipe-joints.*" Provisional protection only obtained. Dated Nov. 5, 1872.

This invention consists in packing stuffing-boxes and pistons, also in making pipe-joints with sheets of thin laminated metal; for example, tin foil. For stuffing-boxes, hemp or other material for containing a lubricant is sometimes added to the metal packing.

3299.—LAKE, W. R., Southampton Buildings, London, "*Improvements in electric torches for lighting gas.*" A communication. Patent dated Nov. 7, 1872.

This invention relates to hand devices or torches for lighting gas by the generation of an electric current, and consists in a device that is independent of the gas-burner or fixtures to which the burner may be attached, or any medium independent of the torch itself, except the hand. It further consists in a torch constructed with a chamber or deflector for receiving the escaping gas and mixing it with the air, so as to light the gas with the chamber or deflector away from or above the burner.

The electrical generating device may be constructed as described in patent No. 783, 1872. To the extremity of the stem-conductor a gas chamber or deflector is secured, so as to be used away from or above the burner, and to receive the escaping gas and mix it with the air at such a distance from the burner as will ensure the mixing of a sufficient quantity of air with the gas to render it highly explosive. This receiver or deflector is one of the essential features of this invention, and is preferably made bell-shaped and closed at its top, so that the gas cannot escape vertically, but must be deflected laterally; and for this purpose it is provided with a side opening to cause the gas to be deflected outward after its mixture with the air. Any means which will produce this mixture and deflection of the gas will answer the purpose, but the deflection must be towards the liberating point, and at a distance from the burner; the liberating point is arranged opposite the opening in the gas chamber. This gas chamber is insulated from its metallic stem or support by a hard rubber section, which also insulates the liberating point from the gas chamber or deflector. The positive electric current is completed from the generator to the liberating point through the metallic stem or support, and the circuit making connexion with the earth is completed by a chain or other suitable means for uniting the generator with the deflector or gas chamber. This union, however, must be with the lower portion of the electric generator or with the hand. And in order that this connexion may be isolated from the positive portion of the generator, the lower end of the connecting chain is attached to a bracket, while its upper end is connected to a bracket of the gas chamber, so as to avoid any interference with globes or shades of the burners. This is a highly advantageous arrangement, as it allows the gas chamber or deflector to be used in connexion with any kind of shade or burner chimney in use.

3300.—HEDLEY, G. H. C., SMITH, W., and HEDLEY, T. A., Salisbury Street, Strand, "*Improvements in the manufacture and purification of gas, and in the apparatus employed therein and connected therewith.*" Provisional protection only obtained. Dated Nov. 7, 1872.

According to this invention, instead of using horizontal retorts, as is usual where the distillation of coal and other materials used in combination therewith is carried on in the ordinary manner, and instead of vertical retorts having a foot or horizontal branch or continuation formed at the bottom thereof for the purpose of discharging the solid deposit produced in the manufacture of gas from oils or other hydrocarbons, whether such vertical retorts be used with oil alone or in combination with water, retorts placed or set at an angle of about 45° are employed, the inferior ends of which are closed by mouthpieces, and the superior ends are fitted with mouthpieces or charging boxes having valves fitted thereto for rapidly opening and closing the communication with the retorts. The mouthpiece or valve at the inferior end should be of the same size as the largest section of the retort, so as to discharge the materials contained therein freely. The gas as generated is by preference drawn off from the upper side of the inferior end of the retort.

3342.—ALLEY, S., Glasgow, "*Improvements in apparatus for measuring, pumping, or obtaining motive power from liquids.*" Provisional protection only obtained. Dated Nov. 11, 1872.

In one modification of this invention, the casing has formed within it a segmental annular chamber, in which there reciprocates a duplex segmental plunger, connected with the main centre by a radial arm attached to its middle. With the reciprocation of the plunger flexible bags are alternately turned inside out, and back again, and serve as packing. Two duplex disc valves are used to cause the liquid to flow alternately into and out of the measuring spaces, each valve being in a small recess communicating with the measuring space, and the inlet and outlet openings opposite to each other. The two valves are on rods which are jointed to two parallel levers, so that when one valve closes its inlet, its outlet is open, whilst the inlet of the other valve is open, and the corresponding outlet closed. The valves are reversed by the action on one of the levers of a tumbling weight or spring turned over to each side alternately by the radial arm of the plunger. Rubber rings known as rolling packing may be substituted for the flexible bags, or the plungers may be made to work through stuffing-boxes. In the case of segmental plungers and chambers, each rubber ring is to be made of gradually varying thickness or section to suit the different lengths of travel of each part. The plungers may be made of glass, earthenware, or enamelled metal to reduce the friction, particularly when working through stuffing-boxes; and these materials may also be used in some cases for making the chambers or cylinders.

3347—WILSON, W. P., Duke Street, Westminster, "*Improvements in apparatus used in the manufacture of gas, which improvements are also applicable to other purposes.*" Patent dated Nov. 11, 1872.

This invention has reference to improvements in furnaces, and is based upon a method of construction for which letters patent, No. 717, dated March 17, 1871, were granted. The invention consists in forming additional flues by means of an annular box made of cast iron, the shape and size of the furnace, and is built into the brickwork thereof; the top of the box serving as an inclined dead plate. Water is admitted to a certain height in the box, and the space above the water to the underside of the dead plate is constituted into a flue. The air is admitted from the front, travels along the flue, absorbs moisture, and in the course of its passage abstracts the heat from the brickwork, thus keeping it cool, and preventing its destruction. Instead of the foregoing, the dead plate may have cast on to it two vertical flanges, one of which is made to dip into the water in the ash-pan, while the other rests on the brickwork of the ash-pit. By these means two parallel flues are formed for the purpose previously set forth. The furnace bars are each made of wrought or cast-iron plates riveted together with distant pieces between, so as to afford greater air space in a given area.

3374.—PUNSHON, R., Queen Square, Westminster, "*Improvements in shovels or instruments for feeding fires with fuel.*" Patent dated Nov. 13, 1872.

This improved shovel is adapted to feed the fresh fuel into the bottom of the fire (instead of at the top, as usual), by its being fitted with a sliding box, which is forced forwards into the body of burning fuel at the bottom of the fire after the insertion of the shovel. The front of the box is hinged to receive the fuel, and is by preference inclined. A lever may be applied to the shovel in order to raise the fire by raising the forepart of the shovel.

3386.—JOHNSON, J. H., Lincoln's Inn Fields, "*Improvements in pipe-joints.*" A communication. Patent dated Nov. 13, 1872.

This invention consists in forming the joints of pipes by the combination of a spherical spigot at the end of one length of pipe with a bell-shaped or grooved end of an adjoining length, soft metal packing intervening.

3420.—KAY, J. Z., Phœnix Iron-Works, Glasgow, "*Improvements in and connected with pipe-joints.*" Patent dated Nov. 16, 1872.

By means of this invention one joint admits of two pipe lengths being inclined towards each other. The spigot is formed with a slight enlargement, which is turned of a spherical shape, and the faucet is bored or turned internally to fit that part of the spigot which extends from the widest part of the spherical enlargement to the end. A groove is formed inside the faucet, just beyond the fitting part last referred to, and when making the joint lead is run into this groove. In a second joint a spherical or spheroidal surface is formed on the spigot, and a slightly conical surface is formed inside the faucet. A narrow groove is formed in the widest part of the spigot, and in this groove there is put a ring of rubber. The two pipe lengths are held together by long bolts, springs being interposed to allow of angular adjustment. A third joint

is designed so that it can be caulked or made tight from the inside. The spigot is made without the common bead or slight enlargement at its end, but an equivalent contraction is formed inside the faucet, at or near its end, to retain the packing material when introduced from the inside between the spigot and the faucet. A fourth joint is designed like the third for being made from the inside. The pipe ends are both slightly enlarged, and are formed with flanges entering inwards. These flanges are notched to receive bolts, by which they are fixed together.

APPLICATIONS FOR LETTERS PATENT.

2649.—Doubs, D., and Hartshuff, J. H., both of Newcastle, Pennsylvania, U.S.A., "Improvements in steam-pumps." (Complete specification.) Aug. 7, 1873.
2680.—Carey, R., Brixton, Surrey, "Improvements in pumps." Aug. 12, 1873.
2685.—Harcourt, A. G. V., Oxford, and Fison, F. W., Ilkley, Yorkshire, "Improvements in the purification of gas, and in the extraction of residual products therefrom." Aug. 13, 1873.
2711.—Barber, J., and Ingham, J., Romily, near Stockport, "An improved method of and apparatus for effecting the generation of steam in steam-boilers, which invention is also applicable for the manufacture of gas, and other such like purposes." A communication. Aug. 15, 1873.
2713.—Robinson, A. H., Dublin, "Improvements in water-meters." Aug. 15, 1873.
2728.—Smyth, J. F., Belfast, "Improvements in the manufacture of gas." Aug. 18, 1873.
2729.—Freestone, J. W., Dalston, Middlesex, and Humphris, J., Little Ilford, Essex, "An improved process and apparatus for treating spent oxide of iron to extract sulphur and ammoniacal salts therefrom, and for purifying these products." Aug. 18, 1873.
2734.—Forster, J. R., Newcastle-upon-Tyne, "An improved elastic spigot and socket pipe-joint for gas, water, steam, and liquids." Aug. 18, 1873.
2747.—Turner, R., and Rollason, G. R., Birmingham, "An improved arrangement for counteracting the weight of pendant sliding chandeliers, thereby superseding the use of counterpoising weights, with their attendant chains and pulleys, applicable to all such fittings, required to be raised and lowered without regard to the material used for illumination." Aug. 20, 1873.
2749.—Musgrave, J., and Shillington, T. F., Belfast, "Improvements in stoves, and in apparatus connected therewith for heating." Aug. 20, 1873.
2755.—Carter, C., Liverpool, "Improvements in apparatus for drawing and preventing waste of water from pipes, mains, cisterns, or other sources for domestic or other purposes; also for water-closets." Aug. 20, 1873.
2769.—Clark, A. M., Chancery Lane, London, "Improved apparatus for regulating or controlling the supply of gas or water in buildings." A communication. Aug. 20, 1873.
2779.—Lake, W. R., Southampton Buildings, London, "Improvements in apparatus for the production of light from benzine, naphtha, and other like substances." A communication. Aug. 21, 1873.

GRANTS OF PROVISIONAL PROTECTION.

2482.—Knab, D. C., St. Denis, France, "Improvements in the mode of utilizing the products of distillation of combustible, vegetable, and animal matters in the production of gas." July 19, 1873.
2545.—Hedley, T. A., Abchurch Lane, London, "Improvements in the manufacture, combination, and purification of gases for lighting and heating purposes, and in the apparatus employed therein." July 25, 1873.
2569.—Farron, S., Ashton-under-Lyne, "Improvements in the construction of cocks or taps." July 29, 1873.
2599.—Segers, L., Strand, London, "Improvements in an apparatus for a gas economiser, an apparatus for increasing the illuminating and heating powers of coal gas with reduced consumption." July 31, 1873.
2602.—Casper, E., Finsbury Circus, London, "Improvements in apparatus for supplying water, and in water-purifying apparatus." A communication. Aug. 1, 1873.
2603.—Spice, R. P., Parliament Street, Westminster, and Hartley, F. W., Stockwell Green, Surrey, "Improvements in carburetters." Aug. 1, 1873.
2609.—Lilley, G. C., London Street, London, E.C., "Improvements in cocks or taps." Aug. 1, 1873.
2630.—Carey, R., Brixton, Surrey, "Improvements in pumps." Aug. 12, 1873.
2685.—Harcourt, A. G. V., Oxford, and Fison, F. W., Ilkley, Yorkshire, "Improvements in the purification of gas, and in the extraction of residual products therefrom." Aug. 13, 1873.

INVENTION PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF COMPLETE SPECIFICATION.

2649.—Doubs, D., and Hartshuff, J. H., both of Newcastle, U.S.A., "Improvements in steam-pumps." Aug. 7, 1873.

NOTICES TO PROCEED.

1251.—Harper, J. R., Clerkenwell, "Improvements in gas-lamp blow-pipe apparatus." April 4, 1873.
1376.—Hey, J. G., Cleckheaton, Yorkshire, and Scoden, R., Brighouse, "Improved means or apparatus for treating and utilizing gas tar for heating purposes." April 7, 1873.
1387.—Benson, M., Southampton Buildings, London, "Improvements in constructing, arranging, and working steam pumping machinery." A communication. April 17, 1873.
1403.—Harvie, W., Glasgow, "An improvement in lamps wherein gas is burned." April 18, 1873.
1404.—Harvie, W., Glasgow, "An improvement in lamps." April 18, 1873.
1487.—Skelton, T. A., Essex Street, Strand, "Improvements in street-lanterns to facilitate lighting." April 24, 1873.
1504.—West, J., Maidstone, gas engineer, "Improvements in apparatus used in the purification of gas." April 25, 1873.
1713.—Clark, A. M., Chancery Lane, Middlesex, "Improved apparatus for lighting lamps." A communication. May 10, 1873.
2339.—Grice, R. W., Aix-la-Chapelle, Prussia, "Improvements in the manufacture of gas and coke, and apparatus connected therewith." July 5, 1873.
2527.—St. John, W. H., New York, U.S.A., "Improvements in processes for purifying illuminating gas, and apparatus therefor." July 24, 1873.
2603.—Spice, R. P., Parliament Street, Westminster, and Hartley, F. W., Stockwell Green, Surrey, "Improvements in carburetters." Aug. 1, 1873.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

513.—Richards, W., Brixton, Surrey, "Improvements in machinery and apparatus for charging and drawing retorts used in the manufacture of gas." Feb. 12, 1873.
556.—Atkins, F. H., Fleet Street, London, "Improvements in apparatus and in the materials and appliances employed for the filtration of water, sewage, and other fluids, whereby manure and other valuable products are separated, precipitated, and obtained therefrom." Feb. 14, 1873.
576.—Emmens, S. H., Old Jewry, London, "Improvements in apparatus for producing heat and light." Feb. 15, 1873.
591.—Henderson, A. C., Charing Cross, Middlesex, "Improvements in the purification of water and apparatus connected therewith, together with the mode of cleansing the same." A communication. Feb. 18, 1873.
712.—Hoey, T., Glasgow, "Improved arrangements or apparatus for preventing waste of water in connexion with water-closets." Feb. 26, 1873.
726.—Beakell, C., Manchester, "Improvements in machinery and apparatus for exhausting, discharging, and transmitting air, water, or other fluids." Feb. 27, 1873.
729.—Glover, J., Seckforde Street, Clerkenwell, "Improvements in parts of dry gas-meters." Feb. 27, 1873.
798.—Tiffany, J. C., Portsmouth, U.S.A., "Improvements in means or apparatus for manufacturing and storing illuminating gas." March 5, 1873.
1046.—Baggs, I., High Holborn, "Improvements in the manufacture of gas for illuminating and other purposes." March 20, 1873.
1129.—Barlow, H. B., Manchester, "Improvements in pneumatic pumps." A communication. March 26, 1873.
1471.—Baggs, I., High Holborn, "Improvements in the manufacture of gas for illuminating and other purposes, and in apparatus connected therewith." April 23, 1873.
1887.—Box, W. W., Gas-Works, Crayford, "Improvements in apparatus used in the manufacture of gas." May 26, 1873.
2000.—Baggs, I., High Holborn, "Improvements in the manufacture of gas and gases for illuminating and heating purposes, and in apparatus to be employed in connexion therewith." June 4, 1873.
2209.—Imray, J., Southampton Buildings, Middlesex, "Improvements in modules or apparatus for regulating and measuring the delivery of water or other liquids." A communication. June 25, 1873.

PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2223.—Taunton, E. W. P., "Improvements in pumps." Aug. 11, 1870.

PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2959.—Cotterell, C. F., "Improvements in the manufacture of pipes." Aug. 10, 1866.

Share List
OF
Metropolitan Gas and Water Companies.

(Corrected by Mr. F. N. Goldinc, Sun Court, Cornhill, from the latest Stock Exchange Quotations.)

Number of Shares issued.	Amount per Share.	Name.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£	GAS COMPANIES.	£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	22 — 24
5800	20	Bahia (Limited)	20 0 0	3 0 0	9 — 11
1000	20	Do., preference	20 0 0	10 0 0	24 — 26
750	20	Do., do., redeemable	20 0 0	10 0 0	22 — 24
40000	5	Bombay (Limited)	5 0 0	6 15 0	5⅝ — 6
10000	5	Do., fourth issue	4 0 0	6 15 0	4¾ — 5
10000	20	British (Limited) (Norwich, Hull-Scuiecotes, Hanley, Tunstall & Shelton [Potteries], Trowbridge, and Holywell.)	20 0 0	10 0 0	33 — 34
7500	20	Cagliari (Limited)	20 0 0	7 0 0	15 — 16
100000	10	*Chartered* A shares	10 0 0	10 0 0	14¼ — 15
20000	10	Do., A	4 0 0	10 0 0	3 — 3½ pm.
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	7 — 7½
25000	10	Do., 5 per cent. preference	10 0 0	5 0 0	12¼ — 12⅝
20000	10	Do., 5 per cent. preference, second issue	10 0 0	5 0 0	12¼ — 12⅝
20000	10	Do., 10 per cent. preference	10 0 0	10 0 0	19 — 20
12000	25	Do., D shares	25 0 0	10 0 0	48½ — 49½
17490	100	*Commercial*	100 0 0	10 0 0	154 —156
20000	20	Continental Union	20 0 0	8 0 0	19½ — 20½
10000	20	Do., new	10 0 0	8 0 0	¼ dis — par
10000	10	Do., new, 1872	2 10 0	8 0 0	¼ dis — ¼ pm.
10000	20	Do., preference (Grmny.: Strsbg. France: Cette, Nismes, Montargis Vienne, Roanne, Beaucaire, Rueil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	23 — 25
5000	10	*Crystal Palace District*	10 0 0	10 0 0	15½ — 16½
5000	10	Do., preference	10 0 0	6 0 0	11½ — 12
30000	10	Do., new shares	10 0 0	7 0 0	11 — 12
23406	10	European (Limited)	10 0 0	8 0 0	13½ — 14½
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	8 0 0	2 — 2½ pm.
4054	10	Foreign and Colonial (Limited)	10 0 0	..	9 — 10
5000	10	Hong Kong (Limited)	10 0 0	10 0 0	13 — 13½
1566000	100	*Imperial*	12 10 0	7 0 0	15½ — 15⅝
26000	12½	Do., new shares	£100	10 0 0	159 —161
1300	100	Do., bonds			193 —200
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	56 — 58
3000	40	*Independent*	40 0 0	10 0 0	64 — 66
3000	10	Do.	10 0 0	5 0 0	7½ — 8½
8000	20	Do.	20 0 0	7 10 0	24½ — 25½
	10	Do., D	1 0 0	..	
250000	Sk.	*London*	100 0 0	10 0 0	153 —156
£15000	Sk.	Do., 1st preference	100 0 0	6 0 0	117 —120
	Sk.	Do., 2nd preference	100 0 0	6 0 0	
	Sk.	Do., 3rd preference	100 0 0	6 0 0	
£18781	100	Do., 1st preference stock	100 0 0	6 0 0	
£11828	100	Do., 2nd preference stock	100 0 0	5 0 0	
15000	5	Malta and Mediterranean (Limited)	5 0 0	5 0 0	2¼ — 3½
6000	5	Do., preference	5 0 0	7 0 0	5 — 5½
20000	5	Mauritius (Limited)	2 0 0	7 0 0	2 — 2½
25000	20	Monte Video (Limited)	20 0 0	..	22 — 23
8000	10	Nictheroy, Brazil (Limited)	10 0 0	..	2½—2 dis.
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6¾— 7¼
30000	5	Do., new shares	2 10 0	9 0 0	¾—1¼ pm.
10000	5	Ottoman (Limited)	5 0 0	nil.	1¾— 2¼
17500	10	Pará (Limited)	10 0 0	7 0 0	7½— 8½
27000	20	*Phœnix*	20 0 0	10 0 0	31¼ — 32½
$600000	100	Do., new	45 0 0	7 10 0	58—60 pm.
1440000	Sk.	Do.	100 0 0	5 0 0	89 — 91
5000	20	*Ratelif*	20 0 0	10 0 0	31 — 32
34000	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	36 — 37
7359	5	Singapore (Limited)	5 0 0	7 10 0	4½ — 5
2000	5	Do., preference	5 0 0	7 10 0	5½ — 6
1500	32½	Shanghai	32 10 0	12 0 0	30 — 32
4000	50	*South Metropolitan*	50 0 0	10 0 0	83 — 85
4000	12½	Do.	12 10 0	10 0 0	20 — 21
20000	12½	Do., new shares	2 10 0	10 0 0	3¾—4¼ pm.
15000	10	*Surrey Consumers*	10 0 0	10 0 0	15¼— 15⅝
10000	10	Do., new	7 0 0	10 0 0	4¼— 4⅝
9000	4	United General (Limerick)	4 0 0	2 10 0	1¾—2¼ pm.
1500	10	*Woodsworth and Putney*	10 0 0	10 0 0	14 — 15
1500	10	Do.	10 0 0	7 10 0	11 — 12
2957	10	Do.	10 0 0	7 0 0	
993	10	Do.	3 0 0	7 0 0	
16000	5	*West Ham*	5 0 0	10 0 0	7¾ — 8¼
10000	5	Do., new shares	1 10 0	10 0 0	3—3¼ pm.
		WATER COMPANIES.			
60000	10	Berlin	10 0 0	11 10 0	17½— 18½
12000	100	Chelsea	100 0 0	6 0 0	116 —118
18000	100	East London	100 0 0	6 0 0	120 —122
10000	50	Grand Junction	50 0 0	8 10 0	76 — 78
5840	25	Do., ¼ shares	25 0 0	8 10 0	38 — 39
2160	25	Do., new do.; maximum dividend, 7½ per cent.	25 0 0	7 10 0	33 — 35
4396	100	Kent	100 0 0	6 0 0	119 —121
5339	100	Lambeth	100 0 0	6 5 0	120 —122
1161	100	Do.	20 0 0	6 5 0	
442	100	New River	100 0 0	8 0 0	170 —180
4443	100	Do.	20 0 0	8 0 0	36 — 38
4000	100	Do., debenture stock, 4 per cent.	100 0 0	4 0 0	96 — 98
3036	100	Southwark and Vauxhall	100 0 0	5 10 0	103 —106
1296	100	Do., preference stock	100 0 0	5 0 0	100 —102
	100	Do., D shares	100 0 0	5 10 0	101 —103
		Do.		4 10 0	
	100	Do., new ordinary		4 10 0	
1600	100	Do., new ordinary, No. 1	40 0 0	4 10 0	
18013	61	West Middlesex	61 0 0	16 per cent.	119 —121

IMPROVEMENT IN STREET WATERING.—A new system of street watering, invented by Messrs. Brown and Co., of Edinburgh, has just been tried in the City of London. The arrangements for the purpose are as follows:—Between the kerbstone and the flags of the foot pavement a lead pipe of 1½ inch bore is laid down, almost flush with the level of the pavement, the small groove or gutter left between the flags and the kerbstone being filled up by covering over the pipe with asphalte. At every foot interval the pipe has a fine perforation (made with an awl), in such a direction as to send a low arching jet of water over the street carriage-way; and each perforation is defended by a small iron cap or shield, having a slot for the jet to squirt through, instead of the asphalte covering which protects the unperforated portions of the pipe. Where the street is 40 feet wide the action of two pipes, one along each foot pavement, is necessary for wetting the whole breadth; but where the street is only 27 feet wide one pipe along one side throws the water completely across. In the total length of pipe in Prince's Street—viz., 600 feet—having that number of perforations, a sufficient "sparge" of water simultaneously over the 1320 square yards of asphalte carriage-way was maintained through a single 3-inch "connexion" from the New River Company's mains. The dust was laid almost instantaneously when one man turned on the water by the single tap for the purpose, and a thorough washing of the street was effected in a very few minutes, with the use of 300 gallons of water as measured by the company's meter, the pressure indicated by a gauge being (as usual for the house supply) about 40 lb. Of course the slush had to be collected at the gulley-holes in the ordinary way by men working the india-rubber "squeegee." The outlay for the pipes is estimated at about £85 per mile. The cost of labour for keeping down the dust over the whole of the City of London area would be only £48 15s. a year and it is believed that there would also be a great saving in the consumption of water.

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WITH

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PATENT

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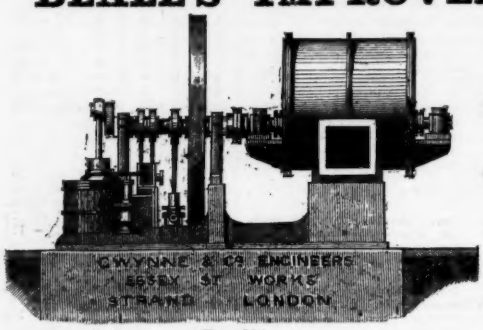

FIG. 224.

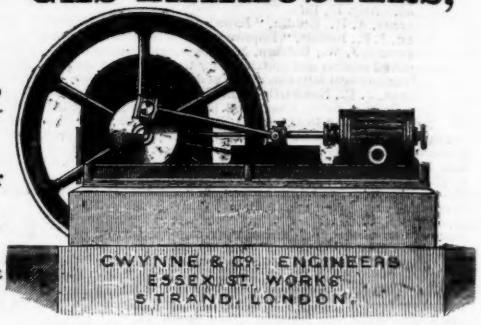

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. do not pretend to enter into a struggle with other makers in respect to **cheapness.** They have never sought to make **price the chief consideration,** but to produce Machinery of the very highest quality, and the most approved design and arrangement. Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result.

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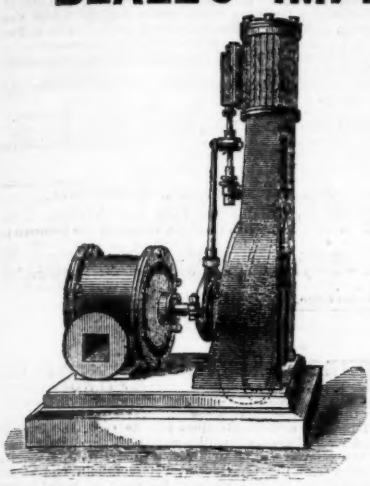
BEALE'S IMPROVED PATENT GAS-EXHAUSTER



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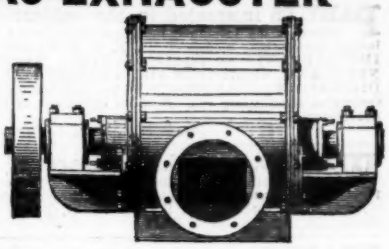
Who, since Mr. BEALE'S retirement, are the Oldest Makers.



EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS,
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

THE STEAM STOKER COMPANY, LIMITED,

ARE NOW PREPARED TO GRANT

LICENCES FOR THE USE OF THEIR VARIOUS PATENTS

FOR

STOKING BY MACHINERY.

UNDER one or the other of their Patents, Machines can be adapted to almost any existing works without material alteration of the Retort-Houses or Settings.

Applications, accompanied by full particulars as to dimensions of the Retort-Houses, Settings of the Retorts, &c., &c., should be addressed to the Secretary, at the Offices of the Company,

155, FENCHURCH STREET, LONDON, E.C.

THORNELOE'S

PATENT VALVE.

THORNELOE & COCHRAN,

GAS ENGINEERS AND CONTRACTORS,

SOLE MAKERS OF

CHANDLER AND SON'S

PATENT REGULATING DIP-PIPE.

Copy Testimonial.—A series of experiments have taken place at the Erith Gas-Works with "Chandler's Patent Dip-Pipe," which was found to prevent any deposit of carbon taking place at the back or on the surface of the clay retorts; there was also considerable increase of gas per ton of coal carbonized, whilst the apparatus continues working with the greatest simplicity and certainty.

Prospectus, with Price Lists and Particulars, on Application.

THORNELOE'S PATENT VALVE

For GAS and WATER, from 3 to 24 inches,

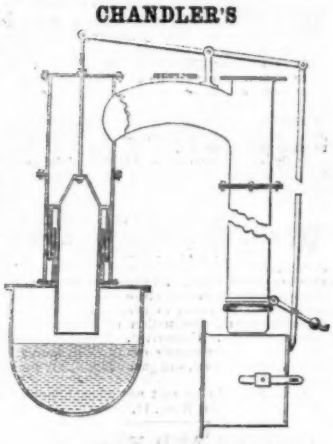
SUPPLIED FROM STOCK.

They are now in use at the following Gas-Works in London:—PHŒNIX and SOUTH METROPOLITAN; also at Aylesbury, Aldershot, Colchester, Farnham, Guildford, Leicester, Ilford, Middlesboro' Patent Gas Company, Reading, &c.

ADDRESS—

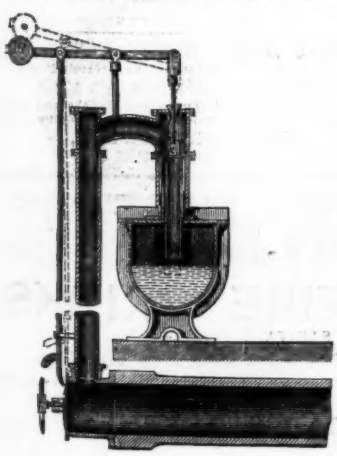
34, LONDON WALL, LONDON, E.C.

CHANDLER'S



PATENT DIP-PIPE.

CHANDLER'S PATENT DIP-PIPE.



It is well known by all Gas Managers that back pressure upon the retorts greatly retards the production of gas, causing a deposit of carbon which keeps steadily accumulating. Such carbon reduces the capacity of the retorts, requires extra fuel for heating, and has to be frequently removed by heavy iron bars, which very much injure the retorts. By the use of Chandler's Patent Dip all these evils are entirely remedied. When the retorts are being drawn and charged, the Dip-Pipe is sealed in the fluid of the hydraulic main. As soon as the lids are replaced, the Dip is raised completely out of the fluid, and the gas passes unrestricted to the holders. By running the exhauster to a level gauge, ALL PRESSURE IS REMOVED FROM THE RETORTS. The consequence is that there is no deposit of carbon, no need of scurfing, no extra fuel is required, a large saving of wear and tear and loss of time is effected, and a greatly increased production of gas per ton of coal is realized.

The following testimonial letter has been received from the manager of the Erith Gas-Works:

Messrs. Chandler and Sons.—Gentlemen,—I beg to inform you that during last week I carbonized 18 tons 5 cwt. of Ravensworth Pelaw Coal in a single setting of retorts fitted with your Patent Dip-Pipes, and obtained a yield of 195,800 feet of gas, equal to 10,730 feet per ton, which is a considerably greater yield than I have been able to obtain before using your Dip. The single retort fitted with your Patent Dip, which has now been in use here upwards of four months, has been throughout, and is now, quite free from carbon.—I am, gentlemen, &c.,

Erith Gas-Works, Aug. 2, 1873. (Signed) D. VINCENT, Manager.

For terms of use and cost, apply only to the Patentees,

Messrs. CHANDLER & SONS, YORK STREET, LONDON ROAD, SOUTHWARK, LONDON, S.E.

OFFICE OF CONTINENTAL GAS STOKER AND COAL-CONVEYING MACHINERY,
65, FENCHURCH STREET, LONDON, E.C.

PARTIES interested in the subject of labour-saving machinery are respectfully invited to inspect the working models of Mr. T. F. ROWLAND'S IMPROVEMENTS IN COAL-CONVEYING MACHINERY, AND APPARATUS FOR CHARGING AND DISCHARGING GAS-RETORTS, as applied to the manufacture of illuminating gas. Now on exhibition at the above address.

WARREN E. HILL, Engineer.

WANTED, a Working Manager of a Gas-Work. Must understand fixing meters, fitting, and index taking.
Apply to the CHAIRMAN of the Gas-Works, Burnham, BUCKS.

WANTED, a re-engagement as Gas ENGINEER and MANAGER. Advertiser has had thorough practical experience in every department connected with the erection and management of works. Has no objection to go abroad.
Address B. T. J., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Manager of a small, or ASSISTANT MANAGER of a large Gas-Work. Twelve years experience, last five years as Manager of a small Gas-Work. Also accustomed to make out and collect accounts. Good references.
Address Z., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for the Whitstable Gas Company, a steady man as STOKER. He would be required to make himself generally useful on the works. An acquaintance with out-door work also desirable. Constant employment. Wages 27s. per week.
Apply to the MANAGER, Gas-Works, Whitstable, KENT.

WANTED, by the Advertiser, aged 28 (at present with a large Gas Company, and having ten years experience), a situation as MANAGER. Unexceptionable testimonials and references. Uses the photometer. No objection to go abroad.
Address PHOTO, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a young man, who has had about seven years practical experience, a situation as MANAGER of a small Gas-Work, [or ASSISTANT in a large work. Is a good draughtsman. Has a thorough knowledge also of the books and accounts, and would be willing to make himself generally useful in a Gas-Work. Unexceptionable testimonials as to character and ability can be produced.
Apply to H. N. H., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OUT-DOOR SUPERINTENDENT.

WANTED, by the Alliance and Dublin Consumers Gas Company, having about 20,000 meters, an active, energetic, and experienced CHIEF INSPECTOR or SUPERINTENDENT of the Out-door Department. He will be required to have a thorough knowledge of main and service laying, the testing and registration of meters, the inspection of public lamps and consumers fitting, and testing the illuminating power and purity of the gas supplied. A liberal salary will be given to a competent person.
Apply, enclosing copies of testimonials, on or before the 30th of August, addressed to the SECRETARY, 114, Grafton Street, DUBLIN.

ASSISTANT GAS ENGINEER.

WANTED immediately, a gentleman as ASSISTANT ENGINEER in a Gas-Work abroad. Healthy climate. He must be thoroughly qualified, able to prepare plans, and possess a practical knowledge of all details in the manufacture and supply of gas. He will be required to assist in accounts, and to undertake the supervision and instruction of workmen. Age not to exceed 28 years. Unmarried. The engagement will be for five years. Commencing salary £350, increasing to £500, with residence, coal, and gas. First-class passage out and home.
Applications to be sent not later than the 3rd prox., to D. W., care of Mr. King, 11, Bolt Court, FLEET ST., E.C.

COOKING AND HEATING BY GAS,
BY
MAGNUS OHREN, A.I.C.E.

NEW AND REVISED EDITION.

Prepared for Gas Companies to circulate amongst their gas consumers.
£1 per 100; £3 15s. per 500; or £6 per 1000.
Address, MAGNUS OHREN, Gas-Works Lower Sydenham, London, S.E.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields, January, 1873. W. J. WARNER.

TRAVELLER AND COMMISSION AGENCY.

THE Advertiser, working the Midland, Eastern, and Southern Counties, desires to REPRESENT good manufacturing firms of Dry Meters, Brass Work, Chandeliers, Tools, Machinery Oil, and other details used principally by Plumbers and Companies.
Letters in confidence to A. B. C., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO MANUFACTURERS.

THE Advertiser having invented a Centre Valve, which works two Purifiers, so that the gas will pass through either or both (either one being first), so that there will be no waste of lime half spent—the valve is quite simple, and cannot stick; all faces are covered—will be glad to receive offers for Right to Patent same.
Apply to J. SMITH, Gas-Works, Lampeter, SOUTH WALES.

MR. NORWOOD EARLE, late of the Dover Gas-Works, is prepared, after 17 years experience, to undertake the duties of SURVEYOR to Gas Companies and Corporations in all matters relating to the Distribution of Gas and Gas Testing. Contracts entered into for the Survey of Mains, Services, Public Lamps, &c., in order to reduce the per centage of unaccounted-for gas to the lowest possible amount.
Valuations for Assessment, Transfer, and other purposes.
Offices, MANSION HOUSE CHAMBERS, 12, Queen Victoria Street, LONDON, E.C.

EXHAUSTER FOR SALE.

TO BE SOLD, a 30,000 feet per hour Beale's EXHAUSTER, with inlet and outlet valve.
Apply to S. STUDHOLME, Engineer, Old Gas-Works, WHITEHAVEN.

METER FOR SALE—A Meter constructed to pass 900 feet per hour.
Apply to the MANAGING DIRECTOR, Risca and Pontymister Gas Company, Bank Chambers, Newport, MONMOUTHSHIRE.

FOR SALE—24 feet D-shaped Hydraulic MAIN, 12¼ in. by 12½ in., with dip and H pipes complete.
Also some 12½ in. by 12½ in. MOUTHPIECES, with cast-iron lids, cross-bars, and screws complete.
The above have been replaced by larger ones.
For further particulars apply to CHARLES WRIGHT, Manager, Gas-Works, SAFFRON WALDEN.

FOR SALE—One 40 ft. by 16 ft. Gasholder, at present in use, with 7-in. inlet and outlet pipes and hydraulic valves complete.
Can be seen working at the Radcliffe and Pilkington Gas-Works, near Manchester, or any information can be obtained respecting the same by application to D. BRANDWOOD, the Company's Manager and Secretary.
July 7, 1873.

GAS-PURIFIERS FOR SALE, SECOND HAND.

A SET OF FOUR PURIFIERS, each 7 ft. by 4 ft., and 2 ft. 6in. deep, with 9-in. seal hydraulic centre-valve and 8-in. connexions complete. Set of Wood Sieves, nearly new. The Purifiers are being replaced by larger size. Also a 12-inch Hydraulic Centre-Valve.
May be seen on application at the Gas-Works, NUNEATON.

TO BE DISPOSED OF, in consequence of being replaced by larger ones, a pair of 6 H.P. VERTICAL ENGINES, with oscilating cylinders, and a pair of 20,000 feet per hour Rotary Exhausters, with all valves and connexions.
Also 28 15-in. D Mouthpieces and Ascension-Pipes to suit.
The above are in good condition, and will be sold together or separately.
Apply to W. C. WATSON, Engineer, Gas-Works, KINGSTON-ON-THAMES.

THE NEW GAS COMPANY, LIMITED.

THE Directors of the above Company are ready to receive APPLICATIONS from owners of existing Gas-Works, as well as from others erecting or about to erect new works, and to grant Licences for the use of the Patents.
Apply to the SECRETARY, 22, WALBROOK, E.C.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Brighouse Local Board are prepared to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR manufactured at the Gas-Works for one year, from the 1st of October next.
Particulars as to quantities, &c., may be learnt on application, and sealed tenders, at per ton, on the works, must be sent in or before the 25th proximo, addressed to the Gas Committee. By order, JAMES RILEY, Manager.
Dated this 23rd day of August, 1873.

HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

THE BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is hereby given that the SECOND HALF-YEARLY ORDINARY MEETING of the PROPRIETORS of this Company will be held at the Gas-Works, New Barnet, on FRIDAY, the 29th day of August, 1873, at Two o'clock in the afternoon, for the following purposes:—
To receive the Directors report and statement of accounts.
To declare a dividend.
To determine the remuneration of the Directors and Secretary.
By order,
W. C. HUMPHRYS, Secretary.
Chief Office, Albert Road, New Barnet.
The Transfer Books will be closed from the 15th of August to the 29th, inclusive.
Dated this 12th day of August, 1873.

TAR AND SULPHATE OF AMMONIA.

THE Directors of the Cambridge University and Town Gaslight Company are prepared to receive TENDERS for the purchase of their TAR and SULPHATE OF AMMONIA.
Further particulars may be had of the Manager, Gas-Works, Cambridge. W. WOOD, Manager.
Cambridge, Aug. 7, 1873.

PETERBOROUGH GAS-WORKS.

CONTRACT No. 1.

THE Directors of the Peterborough Gas Company are prepared to receive TENDERS for the erection of a RETORT-HOUSE and other Buildings, and for the construction of other works.
Drawings and specifications may be seen, and forms of tender with bills of quantities may be obtained, on payment of one guinea each, on application to Mr. W. J. Moon, the Manager, at the Gas-Works, Peterborough, and at the offices of Mr. G. W. Stevenson, Engineer, 19, Great George Street, Westminster, on and after Tuesday, the 19th day of August inst.
Tenders must be delivered to the Manager, at the Gas-Works, Peterborough, on or before Monday, the 8th day of September, 1873. By order,
JOHN GRAVES, Secretary to the Company.
Peterborough, Aug. 9, 1873.

PHOTOGRAPHS of the "British and North British Associations of Gas Managers," taken at Tarbet, Lochlomond, on Thursday, June 12, 1873, may be had from JOHN STUART, 129, Buchanan Street, Glasgow. Price, per post (on roller), 3s. each.

AN ANALYSIS OF THE

METROPOLITAN GAS COMPANIES ACCOUNTS for 1872.

Compiled and arranged by JOHN FIELD,
Chief Accountant to the Imperial Gas Company.
Can be obtained from the AUTHOR, at 26, Arundel Square Islington, N., per post; or of EDEN FISHER, Stationer, 50, LOMBARD STREET, E.C. Price £1 1s.

SUPERIOR FIRE-BRICKS.

THE "TAMAR" FIRE-BRICK AND CLAY COMPANY, Limited, offer to supply FIRE GOODS of superior quality on very reasonable terms.
The "Tamar" Fire-Bricks are unusually free from iron, and are considered to be fully equal to Stourbridge and Newcastle.
For particulars, apply to the SECRETARY, 5, Great Winchester Street Buildings, London, E.C.
July 29, 1873.

GAS COMPANIES
AND
LOCAL BOARDS
Requiring New Street-Lamps are recommended
KEEN'S PATENT
DOUBLE-CLIP
STREET-LAMP.
A great improvement on the old-fashioned 14-in. Lamps.
They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.
For particulars of price, &c., apply to
WILLIAM KEEN, Sole Proprietor and Manufacturer, Robertson Street, HASTINGS.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS,
&c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

OXIDE OF IRON.—We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

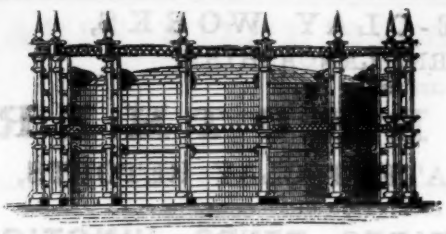
Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

Mr. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

G. J. EVESON,

GAS COAL MERCHANT,

STOURBRIDGE.

Delivery per Rail to any Part.

TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

WALTER MABON & CO.,

Engineers,

ARDWICK IRON-WORKS,

FAIRFIELD STREET, MANCHESTER,

MANUFACTURERS OF

IRON TANKS, GASHOLDERS,

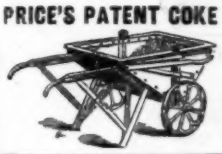
GAS APPARATUS,

PIPES, VALVES, IRON ROOFS,

WROUGHT AND CAST IRON GIRDERS.

DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

PRICE'S PATENT COKE & COAL BARROW,



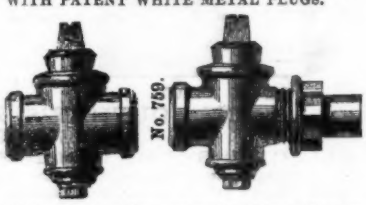
effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

LAMBERT'S

CAST-IRON GAS-MAIN COCKS,

WITH PATENT WHITE METAL PLUGS.



The bodies of these Taps are made of Iron, black or galvanized, and the Plugs of Patent Metal. They are warranted not to set fast or corrode as do iron or brass Cocks, will always work easily, are strong, well made, durable, of little or no intrinsic value, and, therefore, not likely to be stolen; and the PRICES are (especially upon the larger sizes) FULLY 50 PER CENT. LESS THAN BRASS COCKS.

GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.:
WROUGHT-IRON WELDED TUBE AND FITTINGS,
BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING,
Stocks, Taps, and Dies, and Every Description of Gas-Fitters Tools; Gas Slide and Sluice Valves;
CARTER'S SAFETY GAS-VALVES;
GAS-STOVES, REGULATORS, BURNERS, &c.
Pattern-Book and Price List of Gas-Fittings, supplied on application.

THOS. LAMBERT & SONS, Lambeth, London, S.E.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

GAS PURIFICATION.

JOHN WM. O'NEILL AND CO.,

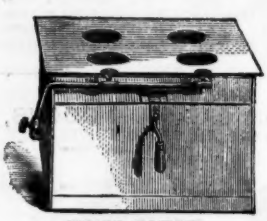
CONTRACTORS FOR

GAS PURIFICATION BY OXIDE OF IRON,

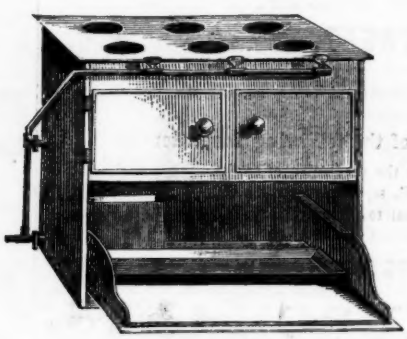
39, LOMBARD STREET, LONDON, E.C.

THE ECONOMIC GAS-RANGE & ROASTER COMPANY,

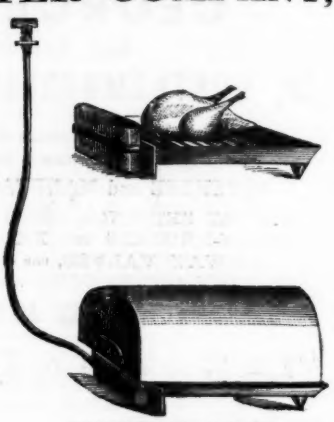
TABLE ROASTER.



SMALL RANGE.



LARGE RANGE.



ROASTERS, Nos. 1, 2, & 3.

ON SOUTHBY'S PATENT, WHICH SECURES PERFECT VENTILATION.

A 7-lb. JOINT ROASTED TO PERFECTION FOR ONE HALFPENNY.

SELECTED BY THE COMMISSIONERS FOR THE ANNUAL INTERNATIONAL EXHIBITIONS, 1871 & 1873.

A pennyworth of gas, perfectly consumed and economized as it is under this Patent, does as much work as six pennyworth of coal. The peculiar arrangement of cannel fishtails in a chimney secures freedom from smoke even with the richest gas, and a positive immunity from every trace of smell. The simplicity in use is so great that no experience is required. Roasters from 10s. 6d. to £1 5s. Complete Ranges at £2 for small families; £3 10s. for ordinary establishments; and £6 for a Range equal in power to a large Kitchener. Estimates given for fitting up Hotels, Restaurants, and large Establishments.

Works: 2, BASSETT STREET, MALDON ROAD, KENTISH TOWN, N.W.

WILLEY AND FORD,

GAS ENGINEERS,

WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

ENGINEERING DEPARTMENT.

NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

GASHOLDERS AND TANKS.

RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

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They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

GAS-FITTING DEPARTMENT.

An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

☞ PLEASE NOTE THE ADDRESS—

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

SCHOLL'S

PATENT PLATINUM

GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.

"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.

To be had retail of Gas-Fitters and Ironmongers.

JOHN SCHOLL, Manufactory: 41 & 42, BERWICK STREET;

Retail Depot: 198a, OXFORD STREET, LONDON, W.

Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

*** Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

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ELLIS LEVER & CO.,

GAS COAL MERCHANTS,

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ALL CLASSES OF

ENGLISH, SCOTCH, & WELSH CANNEL COALS.

SAM. CUTLER & SONS,

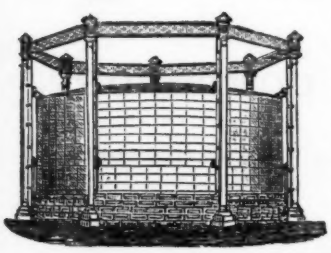
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their "**Improved Condenser**," which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers**, and **Purifiers**, of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves**.

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VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water**, and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: **PROVIDENCE IRON-WORKS, MILLWALL, LONDON.**

B. CARPENTER'S

IMPROVED WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

22, HERMES STREET, PENTONVILLE ROAD,

LONDON, N.

The above Sieves are used by all the Gas Companies in London and a great many in the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

INTERNATIONAL EXHIBITION, 1862.

CLASS X.

PRIZE MEDAL

For excellence of Fire-Clay Gas Retorts, and

"HONOURABLE MENTION" for

good quality of Fire-Bricks.

WILLIAM STEPHENSON & SONS,

THROCKLEY,

NEWCASTLE-ON-TYNE.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire-Bricks and every description of Fire-Clay Goods.

CLAYTON'S PATENT SIX-WAY VALVE only requires one valve to work two purifiers; saves more than three-fourths of the connexion-pipes; requires neither tees, elbows, nor bends; no racks or springs to get out of order.

For particulars, apply to CLAYTON, SON, & Co., Gas Engineers, Hunslet, LEEDS.

TO GAS COMPANIES, ENGINEERS, &c.

WOOD SIEVES.—WOOD SIEVES.

Estimates given and Contracts taken by the Manufacturer

GEORGE MACKANESS,

36, EDWARD STREET, HAMPSTEAD ROAD,

LONDON, N.W.

These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.

N.B.—Specimens sent free on application.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

ALEXANDER F. PAINTER,

CONTRACTING ENGINEER

FOR

GAS & WATER WORKS,

GREAT BERKHAMPSTEAD, HERTS.

Foreign Orders carefully executed. Provincial Gas-Works designed and erected. Extensions of Works carried out with despatch. Mains supplied and promptly laid. Public and Private Buildings fitted up. Gasholders, Purifier Covers, and all Sheet Ironwork. Wrought Ironwork to drawing.

Specifications, Estimates, and Tenders given.

GAS-WORKS LEASED.

THE IMPERIAL METER COMPANY, LIMITED,

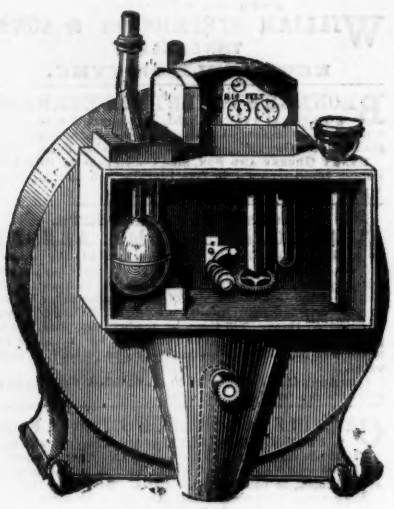
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

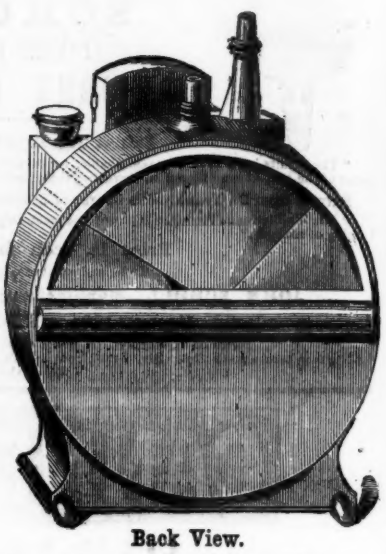
IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.



Back View.

I. **This Meter is more simple in construction than the common non-compensating Meter.**
II. **An unvarying water-line is maintained.**
III. **No amount or kind of pressure will cause it to "flood."**
IV. **It is practically unaffected by "tilting."**
V. **The friction is less than in any other Meter; and**
VI. **It will last for twelve months without requiring to be refilled.**

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

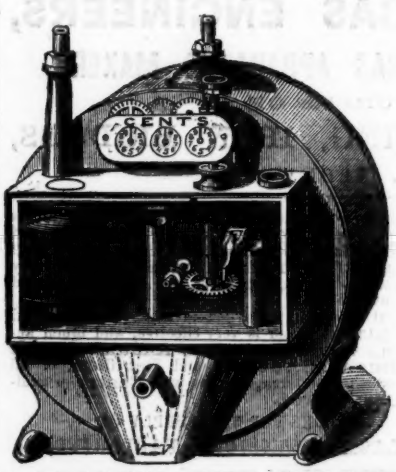
THE COMPENSATING

WET GAS-METER

IS UPHELD FOR

TEN YEARS

WITHOUT CHARGE.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER.

Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

THE IMPERIAL METER COMPANY, LIMITED,

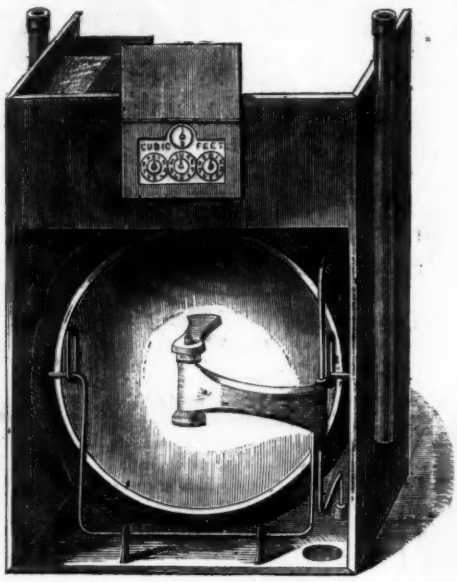
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

IMPERIAL

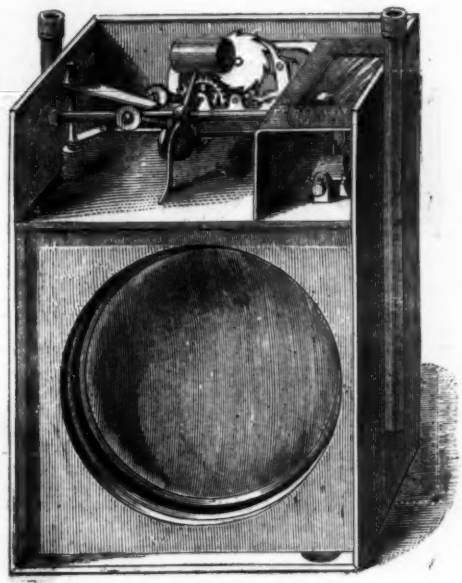
DRY

GAS-METER

SINGLE DIAPHRAGM.

TELLING & JOHNSON'S

PATENT.



Back View.

I. The mechanical construction of this Meter is simpler and stronger than any other.
II. About half as much leather is used as in ordinary dry Meters.
III. The Meter has only one valve, and this cannot "stick."
IV. The lights maintain perfect steadiness and strength of flame. There is no "draw."
V. The gas consumed can only be measured from the inlet to the outlet, and
VI. The index cannot be made to register backwards.

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE ORDINARY DOUBLE DIAPHRAGM DRY GAS-METERS OF ALL SIZES, BOTH IN TIN AND IN CAST-IRON CASES.

SPECIAL ATTENTION

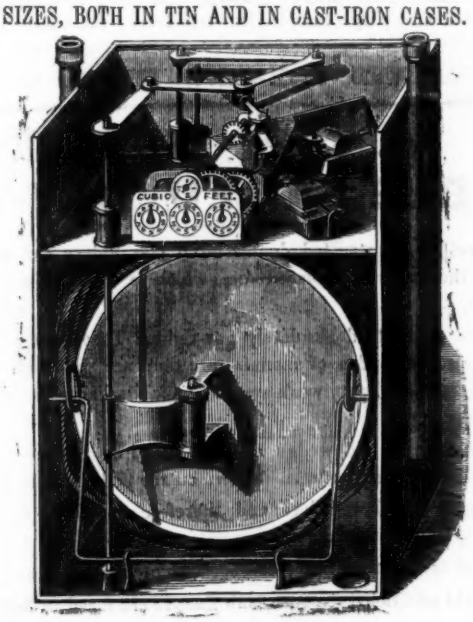
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



EVERY

DRY GAS-METER

IS UPHELD FOR

SIX YEARS

WITHOUT CHARGE.

THE IMPERIAL DRY GAS-METER.
Double Diaphragm.

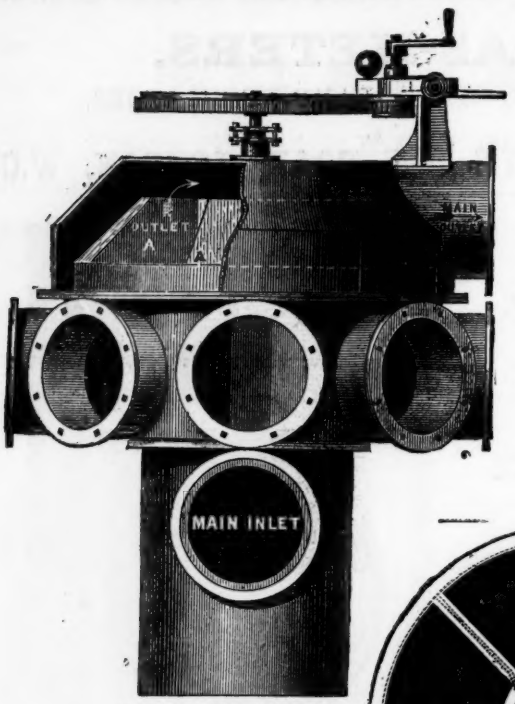
Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

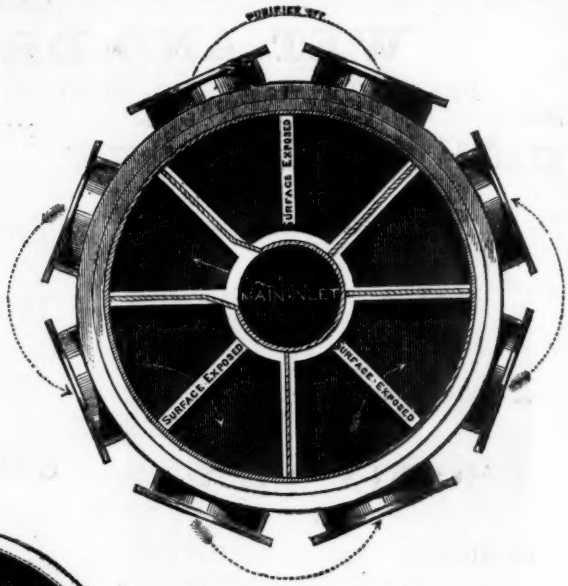
W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

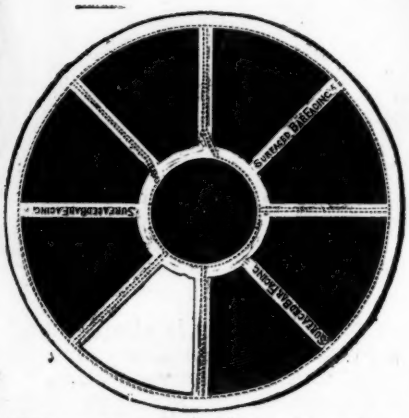
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



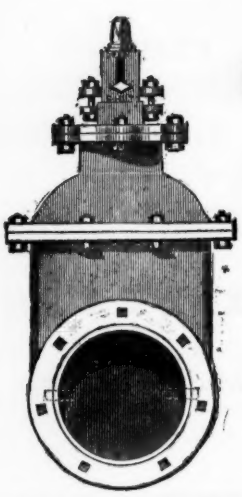
Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



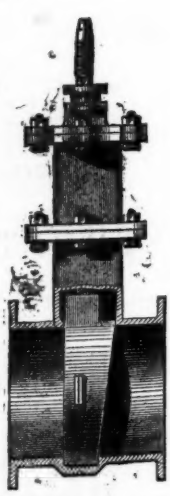
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.



C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

GASHOLDERS, TELESCOPE & SINGLE-LIFT, of LARGEST DIMENSIONS.

PURIFIERS, SCRUBBERS, CONDENSERS of most Improved Description.

WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

ESTABLISHED 1844.

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Comprising numerous Labour-saving Appliances and Economizers of Fuel and Motive Power;

CONTRACTORS TO THE EUROPEAN & COLONIAL GOVERNMENTS & CORPORATIONS;

MERCHANTS AND SHIPPERS OF MACHINERY, METALS, AND HARDWARE;

AWARDED

THE FIRST PRIZE MEDAL AT THE EXPOSITION UNIVERSELLE, PARIS, 1867, "For Improved Construction, Excellence of Material, and Superior Workmanship;"

TWO GRAND GOLD MEDALS AT THE MOSCOW INTERNATIONAL EXHIBITION, 1872;

ALSO THE FIRST PRIZE MEDALS AT LEEDS AND LYONS IN 1858, 1868, and 1872.

"REDUCTION IN PRICES OF PEET'S VALVES, consequent upon largely increased sales."

ILLUSTRATED CATALOGUES AND ESTIMATES ON APPLICATION.

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Samples of Specialties may be inspected at Stand No. 542, Group XIII., in the English Machinery Annexe of the Vienna Exhibition, 1873. For List of same see German Official and "British Section" Catalogues.

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PHŒNIX FIRE-BRICK WHARF,

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GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,

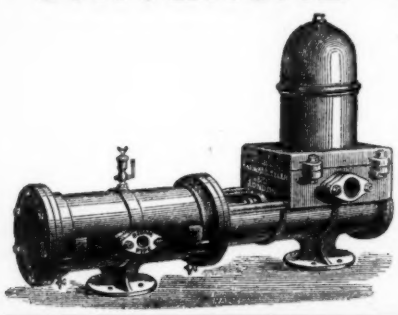
AND FOR THE

SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,

AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

THE PATENT

"UNIVERSAL" STEAM PUMP.



SOLE MAKERS,

HAYWARD, TYLER, & CO.,

84 & 85, UPPER WHITECROSS STREET, LONDON, E.C.

IN USE IN SOME OF

THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,

FOR

TAR AND AMMONIACAL LIQUORS.

Ardwick Bridge Chemical Works, Manchester, Oct. 28, 1872.

Sir,—The "Universal" Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily.—Yours truly,

(Signed) PETER HART, *Manager.*

HENRY SKOINES,

CONTRACTING GAS ENGINEER

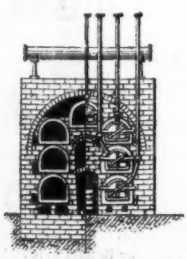
FOR

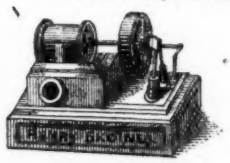
SETTING RETORTS,

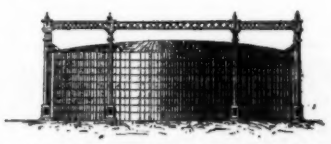
ERECTING AND REMODELLING GAS-WORKS

OF ANY EXTENT, AT HOME AND ABROAD.

RETORTS RESET, and the whole or any portion of Gas Apparatus supplied to the Trade, with their choice of name and device, if desired.







7, ARGYLE STREET, KING'S CROSS.

JOSEPH AIRD,

WELLINGTON TUBE-WORKS,

GREAT BRIDGE, TIPTON,

STAFFORDSHIRE,

MANUFACTURER OF

PATENT WELDED WROUGHT-IRON TUBES AND FITTINGS.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

ROBERT MACLAREN and CO.,

EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

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RENOWNED

WOOD SIEVES,

WITH TAPER BARS,

MADE BY MACHINERY

CAPABLE OF MAKING 10,000 FEET WEEKLY.

References to Hundreds of First-Class Engineers.

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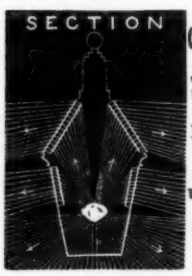
ELLAND, NEAR HALIFAX.

CLOTH GAS-BAGS FOR MAINS,

As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber and Gutta-Percha Machine-Bands, Sheet and Washers for Steam Joints.

T. BUGDEN, Manufacturer,

79, GOSWELL ROAD, LONDON, E.C.



THE PATENT

CATOPTRIC LAMP

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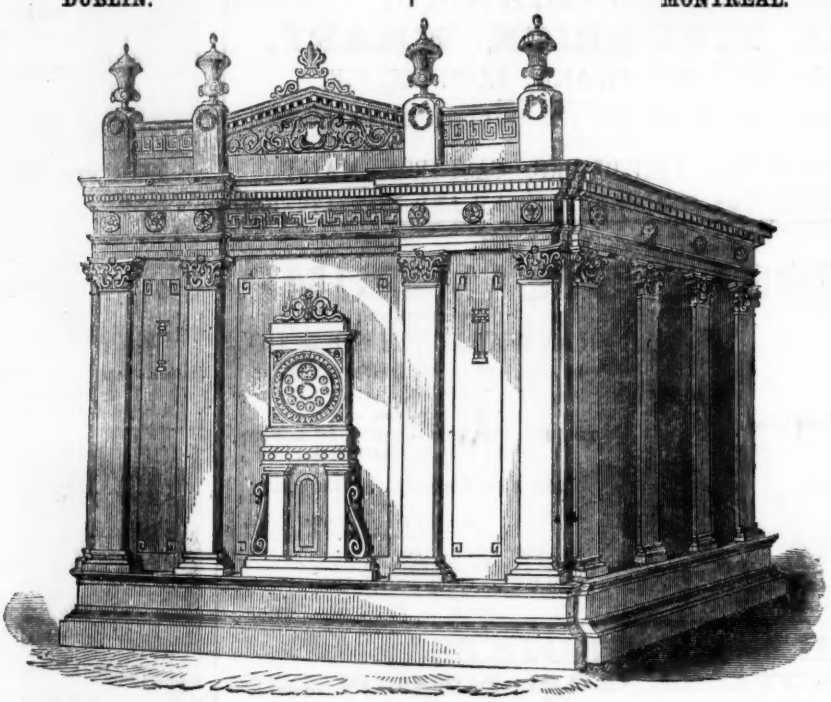

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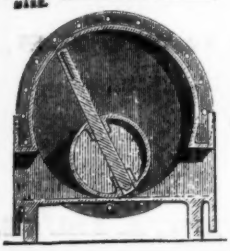

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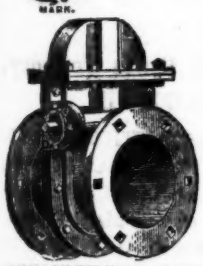

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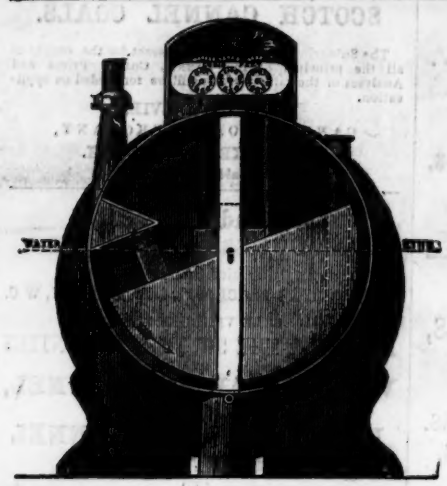

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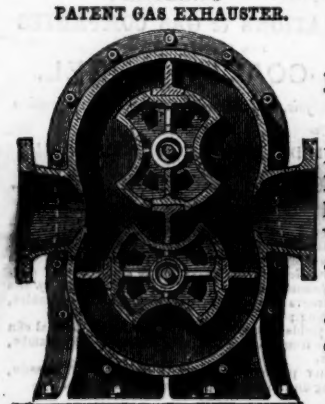

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